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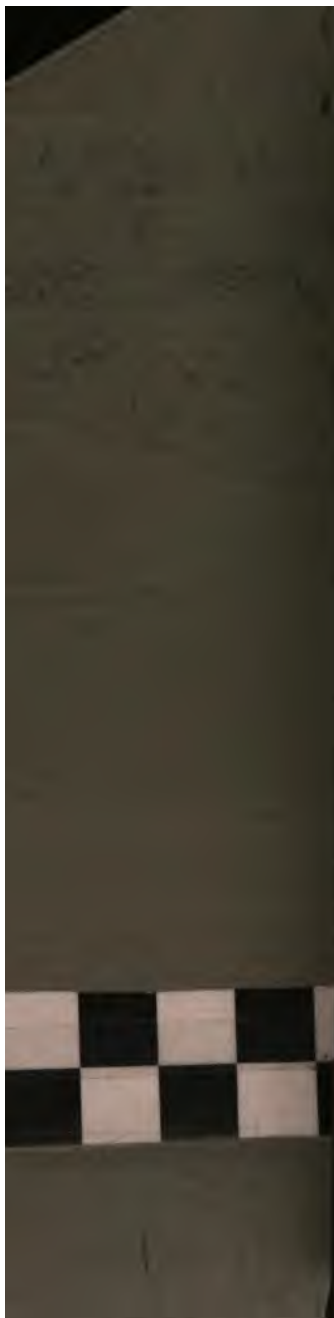
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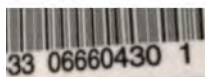
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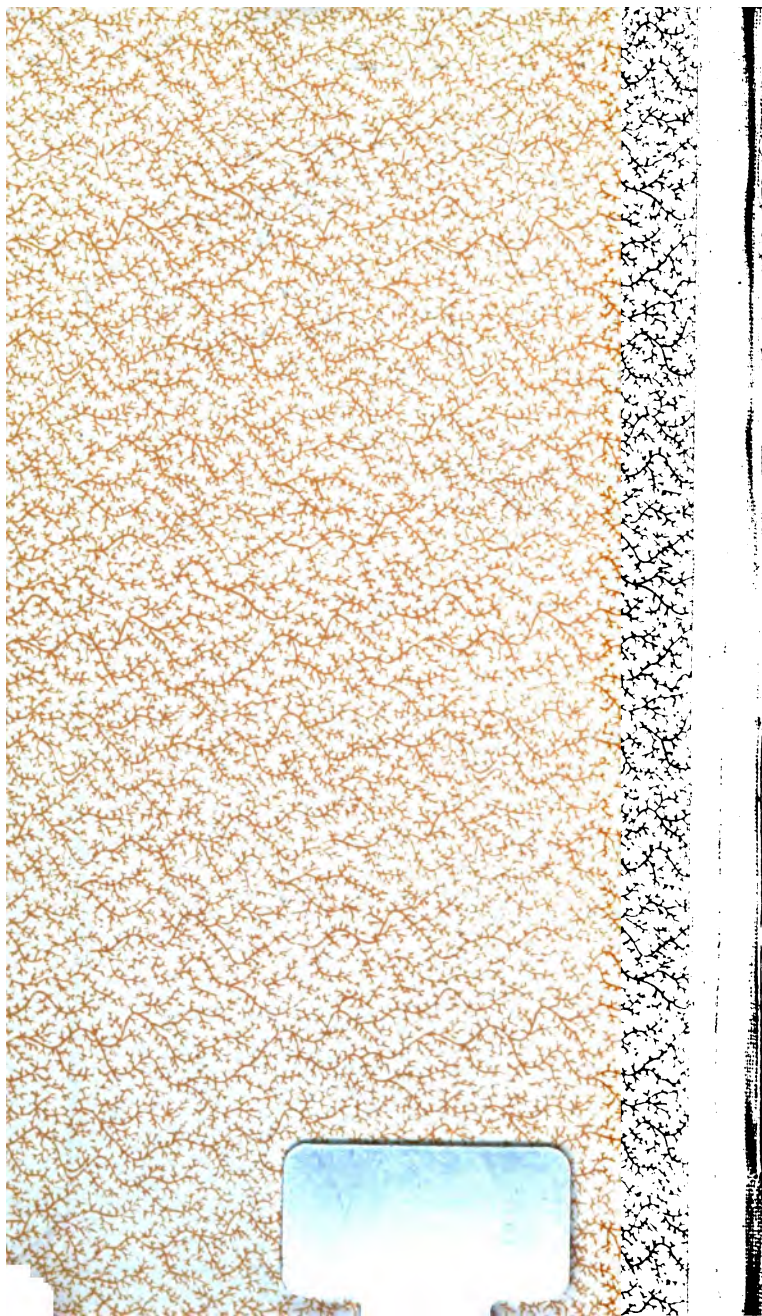


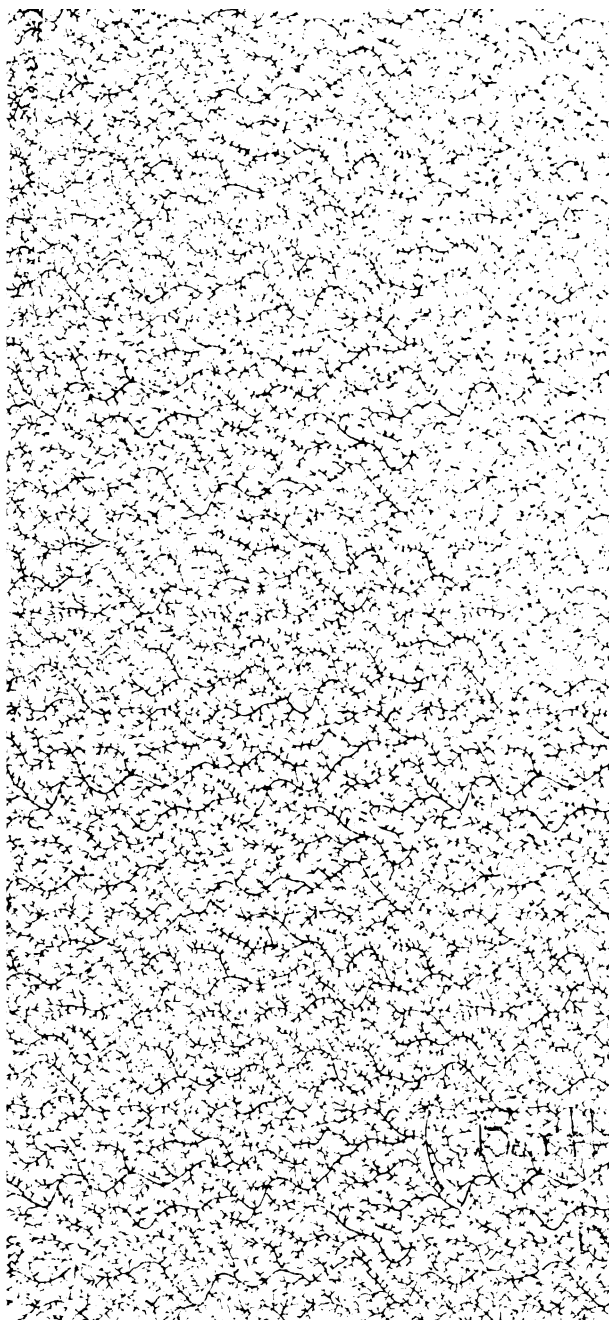
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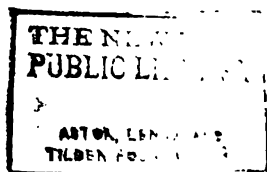


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A BRAZILIAN FOREST.

(From a sketch by Dr. Martins.)

Nov - 1851
1/2

BERTHA'S JOURNAL

DURING

A VISIT TO HER UNCLE

IN

ENGLAND.

CONTAINING A VARIETY OF INTERESTING AND
INSTRUCTIVE INFORMATION.

SEVENTH EDITION.

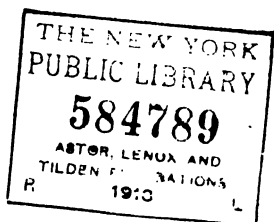
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ADVERTISEMENT.

THIS little volume consists of extracts from the Journal of a young person, who, having passed her childhood at Rio Janeiro, was sent, at the close of that period, on a visit to her English friends.

Her father, Colonel Montague, had been ordered to Brazil upon confidential business; and, foreseeing that it would occupy him for an indefinite time, he carried his family along with him. They had remained in that country several years, when their domestic happiness was suddenly destroyed by his death; and the effect of the shock on his unfortunate widow was such, that she was wholly unable to undertake a voyage to England. She was, therefore, obliged to continue her residence at Rio; but her brother, who had always been tenderly attached to her, requested that she would permit her daughter Bertha to visit him; and, though a most painful separation, she consented, knowing how much, it would be for her child's advantage.

Bertha promised to keep a constant Journal, and to send it whenever an opportunity offered; and such parts of that Journal have been selected by the Editor, as it is hoped may be found useful or interesting.

ROY W. WILSON
JAMES
WILSON

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BERTHA'S VISIT.

VOYAGE.

Luminous Insects—The Ship—Water—Gulf-stream—Plants at the bottom of the Ocean—Boobies—Albatross—Storm—Falmouth.

MY DEAR MAMMA,

H.M.S. Phaeton, June 17th.

THOUGH I wrote to you yesterday by the Blossom, which 'we spoke,' I am tempted by the delightful smoothness of the sea to begin another letter, in order to tell you a little of what I have seen and thought;—but how different from being with you every day—from being your companion as well as your child! I will not, however, say another word about my sorrow at leaving you; I will try to show that I remember your last words: 'affection is best preserved by not yielding to violent feelings.' Indeed, I believe I said too much in yesterday's letter of the misery I felt. I now try to console myself by the hope that, as your health has been so much better for the last two years, you will soon, perhaps, be able to follow your poor little daughter to England; and I repeat to myself all the good reasons that you were so kind as to give for the propriety of sending me to my native country.

I am determined to follow your advice in keeping my mind constantly occupied; and as you have often said that there is no place in which something interesting may not be observed, I shall at once begin the journal you desired me to keep. It shall be ready to fold up whenever an opportunity may occur; so that I shall have the pleasure of making you and my sister, dear Marianne, frequently share with me in all that I see, and all that I enjoy.

20th.—For a day or two after our last faint view of the woody heights of Cabo Frio, I was diverted by the number of pretty land-birds, and even butterflies, that came about the ship, and fluttered in the rigging; and as they gradually disappeared I amused myself, as long as I was able, in gazing on the sea, and in watching the little waves as they dashed against the ship's side. That pleasure soon

ceased, for they became so rough that I suffered very much from sickness: but this evening there has been scarcely any wind; the dark blue sea is almost as smooth as a mirror, and I can walk, and read, and write, as if I was on shore. The captain took me on deck to see the sun setting behind the western horizon: it was indeed a beautiful sight, and the broad red line of light reflected from the water added greatly to the grandeur of the scene.

22nd.—Mrs. P—— is very kind, and tries to rouse my mind, and to make me see whatever is worth observing. Just like you, Mamma, she thinks active occupation is the best remedy for grief, and she has suggested several employments in which she will be my companion. Among other things, we are to learn together the names and uses of the principal parts of the vessel.

24th.—We were much delighted yesterday evening with the luminous appearance of the sea; and the captain has promised to show us some of the insects from which the light proceeds. Many of them are common in all seas, he says; but there are some which are seldom found outside the tropics.

Just as I had written so far, Captain M. invited us to go on deck to look at some birds that were hovering about the vessel. One of them was a *phaeton*, or tropic-bird, of which there are many varieties;—that which I have seen to-day had a red bill, and very long white wings, tipped with black; the legs and feet bright red; the tail consists of only two straight feathers, almost two feet long, which they drop every year. These are worn in the caps of the Sandwich Islanders, and in the mourning dress of the Otaheitans.

25th.—Last night we had the good fortune to procure one of the luminous creatures that make the sea so brilliant. After many fruitless attempts, a bucket of water brought up a fine specimen, about two inches long, and as thick as my finger; somewhat cylindrical and transparent. On its surface are numerous little tubercles; and as there seems to be a cavity all through the body, it might at first be thought one individual, but the captain showed me that it is an assemblage of animals united together. He examined the specimen very minutely, and then put it into a phial of spirits of wine to preserve it. He seems to be very fond of natural history, and told us that the sparkling appearance

of the sea, which may be observed in all parts of the world, is produced by animalculæ, or little creatures that can only be discerned by a microscope.

26th.—We have seen more birds to day. Some of them were *petrels*; they remained a long time skimming about the ship, and though they greedily devoured any fat substance thrown into the sea, all our endeavours to procure one failed. One species was the stormy petrel, which they say is seen all over the Atlantic Ocean. Some chopped straw being thrown overboard, we saw them stand on it with expanded wings; but these birds never settle or swim in the water. They skim along with incredible rapidity in the hollows of the waves. Do you remember these lines?

She swept the seas; and, as she skimm'd along,
Her flying feet unbathed on billows hung.

28th.—The captain was so good as to explain to us this morning the manner in which the rigging supports the masts, and how the yards are raised and lowered, and braced in different positions, in order to adapt them to the force and direction of the wind. He also walked round the gun-deck with us and showed us the cannon, and all their implements, which are kept in such a constant state of readiness, that, in five minutes, night or day, the whole battery would be ready for fighting. But nothing pleased me so much as the lower-deck, where he took us while the crew were all at dinner on nice pea-soup and salt pork, and all sitting comfortably on their chests placed round the tables; of which there is a complete row along the foremost half of the deck. The other end of this deck contains the officers' cabins, which, although not above six or seven feet either in length, or breadth, or height, are very nicely fitted up with a chest of drawers, a little bookcase, a chair, and even a sofa; besides a cot, or bed, which is only hung up at night.

30th.—We have seen the *man-of-war* bird to-day. It has a membranaceous bag like that of a pelican, bright red—the plumage is brown. It is always on the wing, very seldom having been observed to settle on the masts of ships. Other sea-birds, when tired of flying, generally rest themselves on the surface of the water; but the very great length of the wing makes it impossible for this bird to do so, as it could not easily rise again.

When we were becalmed this morning, we had an opportunity of seeing a number of birds of various kinds, the *albatross*, among others;—and one of the dark-coloured variety was caught with a small fishing-line: it measured seven feet between the tips of the wings. Its face is very remarkable, for its flat head and crooked bill give it some resemblance to the owl, which is increased by its large prominent eyes. As we advance to the north, this species will become scarce, Captain M. says, but we shall have the great albatross, which is by far the largest of all aquatic birds.

July 2d.—I have been delighted with the flying-fish, of which we have seen numbers for some days. They ascend sparkling out of the waves, sometimes singly, sometimes in great numbers, when pursued; but in avoiding one danger they are exposed to another, for it is said that the man-of-war bird has been seen to pounce upon them while in the air. Their flight is generally in a direction contrary to the wind, and seldom exceeds a hundred yards; nor do they rise high, though Captain M. says he has seen them fall on his deck. He showed me their enemies, too, the *bonito* and the *albacore*, which, he says, are both of the mackarel tribe. They swim with great rapidity, and are so strong that they sometimes, in the midst of the most rapid course, leap five or six feet perpendicularly above the surface, and plunge again head foremost into the waves.

4th.—I have been looking at Mother Carey's chickens, the least of all the petrels, I believe; and the *fulmar*, which is certainly the most beautiful, for its plumage is of a snowy whiteness, and, as Mrs. P—— observed, seems unsoiled by the water, though constantly diving.

7th.—It seems a very long time since we have seen land, but I am not yet tired of a sea-life. Much as I love all the works of nature, I never felt such admiration for anything as I do for the sea. Its extent, its depth, and the grand and almost terrific sound of its waves—it fills one's mind with awe; and it is wonderful to think that, powerful and uncontrollable as it appears, man should be able to pass over it to the most distant regions, and to guide his ships through its stormy and turbulent waves.

In speaking of the sea, Captain M. remarked how admirably the consistence of water, or, as he calls it, the *viscidily*, is adapted to its various purposes, and to the support

of floating bodies. 'How little,' said he, 'do we observe the objects which are always before our eyes: we see without surprise masses of dust raised by the wind, and carried to a great distance: and we see also that water, though much lighter than dust, is not carried off by the winds in the same manner. If it were, every strong breeze from the ocean towards the land would bring an inundation; navigation would be impossible, and the banks of rivers and seas would be uninhabitable. The adhesion of the particles of water to each other is the cause of its preservation in masses; it would otherwise evaporate like ether, or be dispersed like dust. Such is the simplicity employed by Nature in all her works.'

8th.—We have twice seen the stormy petrel, but as yet it has not been the forerunner of storms;—it is black, with a very little white near the tail. One of the officers told me it is called petrel, after St. Peter, from his having walked on the sea.

9th.—We have been looking at a *grampus*, or a small kind of whale, and at a shoal of *porpoises*, that passed close to the ship. The *grampus* was blowing water up in the air, in the most amusing manner, making beautiful jets d'eau that sparkled in the sun. The captain told me that in sucking in their food the whale tribe draw in a great deal of water, which they have the power of spouting out through a hole in the head.

13th.—Yesterday we crossed the tropic of Cancer. There is already a great change in the sea, which was so beautifully smooth while we were in the torrid zone, that we danced almost every evening; but now it is rough and disturbed, and at times the waves break so violently that I see nothing but foam. I like very much to look at them in that state.

15th.—Mrs. P—— and I have seen several *dolphins*; one of them was struck with the harpoon, and, while hanging upon deck, it was continually changing into an endless variety of colours. The back was blue, then green; its breast a brilliant orange or yellow, spotted with blue and lilac; and its fins were just like a peacock's neck. Indeed, the captain called it the 'peacock of fishes.'

The sea is now quite rough; the tranquil water we had while near the *Line* is gone; and I sometimes find my head too unsteady to be able to write.

16th.—We have seen a great deal of sea-weed for some days; they suppose it to be drifted here by the Gulf-stream. I asked the captain to explain to me what the Gulf-stream is; and he told me that the *trade-wind*, which constantly blows across the Atlantic Ocean from the eastward, forces the sea into the Gulf of Mexico, and makes it rise there above its natural level. From the Gulf it escapes by the narrow channel between the West India islands and Florida, and takes a north-easterly direction along the coast of North America, as far as the island of Newfoundland. It is there turned off to the south-east, and runs to the Azores, or perhaps to the coast of Europe and Africa, before it spreads out and entirely loses itself in the surrounding ocean. The first accurate account of this great current was published by Dr. Franklin, who had discovered that, after being heated in the torrid zone, it cools so gradually that its temperature continues always higher than that of the ocean through which it flows—so much so, that ships can tell when they enter it or leave it, by dipping a thermometer into the sea. Its velocity is very great, as it is said to run at the rate of four or five miles an hour, when it first leaves the Gulf.

A good deal of the sea-weed was hauled up for Mrs. P—— to examine. It seems to be all of one species—the floating *fucus*, she calls it; it is curious what quantities of it are matted together, like a tangle of ropes, and what a number of very small crabs take up their abode in it.

18th.—More sea-weed, but of different kinds. This day the captain showed us some of the vine-leaved *fucus*, which is one of the most curious species. He says it is sometimes brought up, by the sounding-lead, from the bottom of the ocean, where, even at the depth of one hundred and ninety-two feet, its leaves are as green as grass. He says this is considered as one of the few instances of plants vegetating in obscurity, without becoming white; for, though light is transmitted through the sea, yet it is much weakened by passing through such a depth. We have also seen the giant *fucus*, and one of the officers said he had once measured a piece that was eight hundred feet long.

The captain says, that the reason why we find such an extraordinary quantity of sea-weed in this part of the ocean, is that the Gulf-stream expends its force about here; and therefore the weed which it conveys must accumulate, and

remain till it perishes, or till it sinks; and he showed us several specimens in different states of decay. 'Yes,' said Mrs. P——, 'its decay is very evident; but what can make it sink?'

He replied, by showing us several little shell-fish adhering to the under side of a bit of weed. 'These,' said he, 'must have been deposited there before it was torn from its native rocks by the current; in the course of their long voyage they grow; and their increased size and weight gradually sink the weed. My attention was first turned to this curious circumstance from having observed some of the weed lying edgewise in the water; I had it taken up, and found some heavy limpets attached to the lower edge.'

Mrs. P—— acknowledged this was quite a new fact to her.

20th.—The captain amused us to-day by showing a very simple method of ascertaining the saltiness of the sea, which any person can try. He dried a towel in the sun, weighed it carefully, and I noted its weight. It was then dipped in sea-water, and being wrung sufficiently, to prevent it from dripping, it was again weighed, the increase of weight being that of the water imbibed by the cloth. It was now thoroughly dried, and once more weighed; and the excess of this weight, above the original weight of the cloth, shows the quantity of the salt retained by it: then, by comparing the weight of this salt with that of the sea-water imbibed by the cloth, we found what proportion of salt was contained in the water.

22d.—This morning a little land-bird flew on board; I begged to have it; and I keep it in the cabin, and feed it. I asked how they knew it was from the land, and a sailor answered, 'No sea-birds, Miss, except boobies,* ever rest upon the ships they follow; this poor fellow has been blown off shore by some long north-easter.'

Our captain was laughing to-day at the mistakes that authors, who have never been at sea, make in some of their fine poetical descriptions. He mentioned the albatross as an instance, which some one has described as rising off the deck. He says it never alights on the deck, and if it were there, it could not rise again. It finds great difficulty in rising even from the sea, and scrambles along the waves to a great distance before it can fairly use its wings. They

* *Sula communis*.

have five joints to spread out, and appear to have no motion except at the moment the bird first raises itself into the air, when, at the same time, it makes several strokes against the water with its webbed feet. This impulse once given, it seems to have no longer occasion to flap its wings ; it holds them widely expanded while it glides along, balancing its body from right to left, and sweeping majestically over the surface of the sea.

24th.—We have passed two of the Azores or Western Islands :—Flores looked very green ; but the other, Corvo, seems little better than a lofty, naked rock.

25th.—We have had a very hot south-easterly wind this morning, which the captain says comes from Africa. He showed us that the sails and ropes were tinged with the reddish sand that these winds generally carry with them. It was quite impalpable, as he said, to the touch ; and he was for a long time trying to obtain some of it, by washing and roasting, for his microscope.

26th.—I am growing a little tired, dear Mamma, of this long voyage, though Mrs. P—— finds continual objects of amusement for me. Sometimes, when there is a heavy swell of the sea, and the wind blows freshly, we divert ourselves watching the waves : it is curious to see the head of a large wave, just as it rises and meets the wind, dashed off, and changed into foam ; and showing, when we can place ourselves between it and the sun, innumerable little rainbows.

I happened to say at dinner that I wondered how this constantly-moving ocean should ever become frozen into one field of ice ; but the captain told me that the deep ocean never freezes permanently. Any ice that may have been formed on it in winter is broken up by gales of wind, and is drifted about till it becomes fixed to the shores.

The great icebergs that are sometimes seen floating on the sea are formed by the accumulation of ages on high precipitous shores, and are afterwards broken off by their increasing weight.

How extraordinary everything relating to the freezing of the sea is ; and how strange that plants should grow on ice-islands ! How do they get there, or the earth in which they vegetate ?

28th.—There was a sudden change of wind to-day : it drove the sea furiously before it ; and the meeting of the new wind with the old waves made them break as high as

the ship, and like the surf on a reef of rocks: it was most beautiful, but very terrific indeed.

29th.—I suppose that such a sudden change of wind is the forerunner of a storm, for last night there was a dreadful one for some hours. Mrs. P—— and I were a little frightened; but the vessel was not in any danger, Captain M. says. Towards morning the wind subsided; the raging sea became less boisterous; and she and I read together the service for thanksgiving after a storm. Our hearts, indeed, felt what is expressed there. How beautiful are the psalms selected for it—particularly, ‘O come! let us give thanks unto the Lord, for he is gracious.’

30th.—I hear the cry of ‘land!’ They see the land—the cliffs of Cornwall. I must go on deck to see them: how happy I am to be well and able to look at the first appearance of England! I have run down to the cabin to tell you that we are entering a great harbour—Falmouth. There are two castles that protect the entrance: on the right is St. Mawes, and on the left Pendennis.

31st.—At Falmouth!—Yes: in England at last! We anchored last night in the country which you love so dearly. How glad I shall be to go on shore! We are going! Mrs. P—— calls me.

WEEK 1.

Arrival at Fernhurst—Bertha’s Cousin’s Employments—Garden—
The Yucca—The Trellis-walk—Arithmetic—Attention.

MY DEAR MAMMA,

Fernhurst, August 4th.

As I wrote to you on the day after we landed, and told you of the safe arrival of your child in her native country, and of all that I had seen at Falmouth, I will say no more on that subject. My uncle was so good as to come for me, and Mrs. P——, who had been unceasingly kind and tender to me throughout the whole voyage, gave me into his care. I felt much regret at parting from her; and as I was going amongst relations whom I had never seen, I was the more sorry to lose this good friend; but my uncle made Mrs. P—— promise to visit him at some future time. We set out very early in the morning from Falmouth, slept one night on the road, and arrived here yesterday evening to tea. My aunt and cousins received me in the most affectionate manner.

I cannot tell you how odd many things in this country seem. In coming here we passed along great wide roads, which are indeed very different from those in Brazil: they are so smooth that the carriage rolled on without impediment, and I was not half as much tired by the journey here as I have been going only from Rio to the Prince's farm. The whole appearance of the country—the trees, the fields, the roads, the people, the houses, are so different from what I have been accustomed to, that I still feel in a state of constant surprise; but nothing that I see appears so remarkable, as that there are no slaves here—no poor negroes.

Though my aunt and cousins are very good-natured to me, I cannot help feeling a little afraid of them. Indeed, I must confess, though you, who love my uncle so much, will be surprised, that I felt quite a dread of meeting him; but I soon perceived that I was a fool, and that he was as kind and indulgent as you had told me he would be.

On our journey he talked to me of you, dear Mamma, and told me many delightful anecdotes of your youth, when you and he were so happy together. How I do wish your health may soon permit you to return to England, that you may be again with this dear brother!

I am determined to continue my journal regularly; for it will be my greatest pleasure to write everything that interests me to you and my dear Marianne. I shall sometimes imagine I am speaking to you.

August 6th.—It still seems like a dream to think that I am actually here, where I have so often wished to be. This place is altered in many respects, I am told, since you saw it last. Some of the old windows are enlarged; new walks are made; and there is a new flower-garden and conservatory, of which my aunt is very fond. Your favourite walk has been preserved quite unchanged; my uncle loves it so much, that he showed it to me himself, and we sat under your favourite tree, where you and he used to play and read together in those happy times when you were companions. I sleep in your room, which has the same dear old projecting window which you described to me—a half hexagon, with stone divisions, and pretty casement-work between.

8th.—I begin to feel more at ease with all my new friends: indeed, I do not know why I am afraid of them. Generally, before we leave the breakfast-table, one of my cousins reads aloud for about half an hour. This morning,

before we separated, my uncle said, 'My dear children, I hope you will consider my little Bertha as another sister;—we must make her feel at home. Let us go on just as usual with all our employments, and she will gradually cease to be a stranger.'

'I hope,' said my aunt, 'that Bertha does not feel herself a stranger—she will soon become accustomed to our mode of life; but we must give her a little time—we must become acquainted by degrees.'

'But, Mamma,' said Caroline, 'will not my cousin feel a little neglected, if we continue our own pursuits without any attention to hers?'

'Certainly, were that the case; but I think, my love, that, as Bertha will have her own employments, she may not perhaps, at first, like to make one of our happy family school; but, though occupied ourselves, I am sure we shall never be inattentive to her feelings.'

'I dare say Bertha knows that to be always employed is the chief secret of happiness,' said my uncle; 'and I am convinced that both you and she will perceive that we never enjoy the society of our friends so much, as when we have earned it by useful labour or moderate restraint.'

Just then the letters were brought in; one of them from cousin Hertford, who is now visiting the Western Isles, seemed to give great delight to the whole party.

10th.—After breakfast is over, Mary and Caroline retire to my aunt's dressing-room, where they go on with their studies. I long to be admitted to sit there in the mornings, and share in their employments.

Mary is not so pretty as Caroline, but she has a most expressive countenance; her health has been delicate, and she is timid and reserved in company, but very lively when we are quietly together. They are both very charming, but different in many respects.

I generally sit part of the morning in the library, where my uncle invited me, and am very happy, except that when Wentworth and Frederick are engaged with him, I feel afraid of being an intruder. But my uncle likes to have me there, and his conversation is always agreeable and instructive. Yesterday evening my cousins sang, and then we all danced for an hour: even my uncle danced, while my aunt played for us.

11th.—After I had written yesterday, I went out to walk

with my aunt and uncle—my cousins did not come. In the hot-house I saw many plants, nursed with great care, which I had been accustomed to see growing wild and unheeded : such as our beautiful pink and blue passion-flower, the coffee-plant ; jessamines, the many-flowered *gloxinia*, which ornaments our rocks with its beautiful blue flowers, and several others.

In this sheltered place many plants grow wild in the open ground, which do not live in more exposed places in England. The *tigridia*, a native of Mexico, grows here in great profusion. Having heard that the Mexicans eat its roots, or bulbs, my uncle tried them, and found them almost as good as chestnuts.

The little lawn into which the library opens is well defended from all winds, and there the most delicate plants are placed. A miniature grove of orange-trees, in tubs, stands there during the summer,—they have fruit and flowers on them, and they smell delightfully ; but, though healthy, they look stunted to my eyes, accustomed to those of our favourite valley at the foot of the Corcovada—I mean the Laranjeros, where the orange-trees are so numerous at each side of the little stream along which we used to have such delightful walks. When shall I walk there again with you, or wander about the pretty green plain at the entrance of the valley ? How often Marianne and I have made you loiter there, while we looked at the rivulet dashing over its stony bed, or at the grotesque washerwomen, in all their various dresses !

In my aunt's flower-garden are hedges of Chinese rose and sweet-brier, with *pyrus Japonica* intermixed. They are very pretty, but not equal to ours of *acacia* and *mimosa*, with the passion-flower twining through them, and the *bignonia* and *maranta* forming such beautiful garlands, particularly on our favourite green plain. How unequal, too, in strength to those fences that we saw at Pernambuco, made of woven palm-leaves, and covered with our brilliant creeping plants, or to those of *yucca* and prickly pear through which neither dog nor sheep can penetrate. Her garden is on a bank, which slopes from the conservatory to a little stream that runs through the grounds—the flower beds are intermixed with smooth grass-plats—and a wall extends a little way from the conservatory, covered by sort of trellis-work made of thin oak-laths bent and crossed

with roses and climbing plants twisted into it. The bramble-flowered rose is particularly suited to this purpose, and covers it with wreaths of pretty little pink flowers. It is curious to observe the effect of even the small degree of shade caused by the trellis on the young autumn shoots which hang within from the rose trees. They are pale and tender, appearing as if in a house, and not in the open air.

We spend the finest part of the evenings out of doors—walking, sauntering, or sitting—then comes tea; and once or twice we have been tempted to go out again afterwards. Some evenings we read to ourselves; but now and then my uncle is so good as to read aloud, and that is very delightful, he reads so well.

He likes to see us employed while he reads, for he says it is a useful exercise of the attention to listen, and at the same time to employ the fingers. Last night he read, at Mary's request, 'The Midsummer Night's Dream,' while his audience employed themselves in needle-work or drawing. As I had not any work in the room, my aunt said she would supply me. I find that she has always a little store of things to be made for the poor, in readiness to employ those who wish for work: caps, aprons, bed-gowns, and baby-linen. By these means she has always some useful article of clothing ready to give to the distressed people who apply to her; and, besides, she likes that young people should acquire the habit of employing some of their time for the benefit of others.

My aunt truly practises what she advises—to be useful is her great object; but she mixes usefulness and domestic pleasures so well, as my uncle says, that one is scarcely aware of all she effects.

12th.—When I was in the library to-day, looking at some books of prints, and Wentworth and Frederick engaged in their algebra, my uncle coming to the window said, 'Bertha, my dear, are you a good arithmetician?'

'No, uncle, I am not; Mamma has always found it difficult to get arithmetic into my head: I do not know why, but I *cannot* learn it.'

'Perhaps you mean, *will not attend to it*.'

'No, indeed, uncle; but there was always some little thing that was not quite clear, and which prevented me from advancing as fast and as far as I ought.'

'Yes,' said my uncle, 'that is the secret—some little

step, which appears to the instructor so simple as to require no explanation, becomes a stumbling-block to the understanding, and then we imagine we cannot learn; but *cannot learn* I never allow my pupils to say.'

Dear Mamma, my uncle reminds me so much of you sometimes: oh! if I had attended better to your instructions, I should not blush as I do now at my own ignorance; but one comfort is—my uncle knows you so well, that he cannot attribute my faults to your neglect.

But I must tell you all that happened about this same arithmetic. I was so vexed at my own stupidity, and at appearing as if you had taught me nothing, that a few tears forced their way into my eyes, though I tried to struggle against them:—my uncle good-naturedly went back to the table where Wentworth and Frederick were employed, and I soon recovered.

When they had finished their algebra, to which they seemed to give their whole attention, my uncle said, 'Bertha, if you like to try arithmetic again, my daughter Mary will readily assist you: she has one of the clearest heads I ever knew, and will make every step plain. But I must remark that, if we were to force ourselves to repeat every day the substance of what we learn to some third person, we should instantly discover what part is not clear to us.' I went then with him to Mary, who undertook the task in the kindest manner—to-morrow we are to begin.

After this was all arranged, Mary and Caroline invited me to play at shuttlecock, as the day was rainy. Shuttlecock I had never seen, and knew only from your description; my first attempts, therefore, produced a great deal of laughter.

WEEK 2.

Sunday Conversation—Garden Fence—Vegetables used as Food—Glow-worm—Cave of Staffa—Farmer Moreland—Forest—Contrast between England and Brazil.

14th.—*Sunday*. I am sure you would like the way that Sunday is spent in this house, my dear Mamma. There is no day that brings you so particularly to my mind, because several things that occur here make me remember what you have often said in regard to it, and the good habits you tried to give me.

My uncle generally selects some passage in Scripture, for the purpose of conversing upon it, and leading us to think; or else some expression which he sees requires explanation, and on which some light can be thrown, either from parallel passages or from profane authors. These little conversations are, generally, between breakfast and the time of setting out for church.

This day he read the 11th chapter of II^d. Corinthians, and told us, that St. Paul's expression 'to triumph in Christ,' ver. 14, alludes to the Roman triumph, or the celebration of a victory; and as the conqueror went in procession through the streets of Rome to the Capitol, with the attendant captives following the triumphal car, so the apostle describes himself as led from city to city, and from province to province, triumphing over the powers of darkness, while the name of Christ, 'as a sweet savour,' was diffused wherever he came.

My uncle said that this expression, 'sweet savour,' alludes to the custom, in the Roman procession, of strewing the streets with flowers, and causing the altars to smoke with incense; while, immediately before the victorious general, a long train of attendants marched, carrying perfumes, which exhaled a sweet and powerful fragrance;—and thus was the knowledge of Christ, like a reviving odour, diffused around, to improve and strengthen all who received it. Indeed, it is still the custom of all eastern nations, he says, to introduce sweet waters and other perfumes, on solemn occasions, which makes the propriety of the allusion still more strong.

15th.—As we walked through the flower-garden to-day, I ventured to suggest that the *yucca* and the prickly pear would make more impenetrable hedges than the sweet-brier and China rose.

'I cannot help smiling,' said my aunt, 'at your partiality to the plants to which you have been accustomed, when you would prefer hedges of the frightful prickly pear to these. If, indeed, we could have such hedges of the Chinese *hibiscus* as they have in India, they might be desirable.'

I assured my aunt that I did not prefer those plants for beauty, but as useful from their strength, and, therefore, worth introducing into England.

'I am afraid,' said she, 'their succulent nature might make them liable to be injured by frost.' 'Besides,' said

my uncle, 'these plants have not yet been well naturalized to our climate, though they do grow in the open ground in some few gardens; and then we have our beautiful white-thorn, and our furze, both of which, if kept in order and well clipped, make a secure fence against all depredators: the holly, too, with its bright and beautiful dark green foliage, makes an admirable hedge.'

As we walked along, my uncle showed me all these and other plants for hedges, saying, 'You may observe, Bertha, that one of the numerous marks of a gracious Providence is the variety of means which he puts at our command in the different parts of the world. In every region we find plants suited to the soil and climate, and adapted for the use and advantage of its inhabitants; and we may generally discover some circumstance attending them, which renders those native productions of peculiar value to the people who possess them.'

'But, uncle,' said I, 'can that be the case in such countries as Lapland and Norway, which give one an idea of the utmost misery and want?'

'You have named a part of the world,' he replied, 'which is an excellent proof of what I have just said. There, you know, the rein-deer, that most useful animal, contributes in every way to the comfort and the sustenance of the inhabitants. They drink the milk—they eat the flesh—they make clothing of the skin—and, besides, with its assistance, they can move from place to place with delightful swiftness, when otherwise they must be confined by the snow during three-fourths of the year. But what would become of the rein-deer, was there not an abundant supply of the vegetable on which its vast herds are supported—the rein-deer moss? No vegetable grows throughout Lapland in such abundance; for many miles together the surface of the sterile soil is covered with it, like snow: and on the destruction of forests by fire, when no other plant can find nutriment, this moss, or lichen, springs up and flourishes. Here the rein-deer are pastured; and whatever may be the depth of snow during the long winter of that climate, they have the power of penetrating through it, and obtaining the necessary food.'

'But still, uncle,' said I, 'useful as that same moss is, you cannot consider it among the vegetable productions on which man can live. It supports the rein-deer, and the

rein-deer sustains man—but man could not live on moss or lichen.'

'There is a common saying, my little Bertha,' replied he, 'that one half of the world knows not how the other half live. Now, there is a certain lichen, called Iceland-moss, which is brought to England as a medicine, and which no one would suppose could be used as food; yet it is a fact that, in those northern regions of which we are speaking, immense quantities of it are gathered for home consumption as an article of common food. When the bitter quality has been extracted by steeping in water, the lichen is dried and reduced to a powder, and then made into a cake, with the addition of a little meal, or else boiled and eaten with milk; and it is eaten with thankfulness, too, my dear Bertha, by the poor natives, in years of scarcity, who say that a bountiful Providence sends them bread out of the very stones.'

'I might also mention the *tripe de roche*, on which Captain Franklin and his unfortunate companions were reduced to live; but my object was, I believe, to show, not how many mosses or lichens might be eaten, but that every country contains within itself some vegetable productions which are, at times, an invaluable resource to the poor inhabitants. For instance, in that part of the Russian empire near the Caspian Sea, called the *Steppes*, their principal food, in some years, consists of mushrooms dried and powdered, and made into bread, which is neither unwholesome nor unpleasant.'

16th.—My aunt's flower-garden is certainly very pretty, and with those of my cousins, which join it, make a delightful spot; and they all seem to be so fond of their flowers, and to find so much pleasure in gardening, that I begin to think I should like to assist them; but at present I am contented with watching what they do. My aunt said to me, when we were walking there, 'After all, Bertha, I must confess, that the objection I made yesterday against the prickly pear, of its not being adapted to this climate, was not very wise; for had our gardeners been prevented by such fears, we should not now have the variety of foreign plants that we possess, and many of which are not only pretty, but highly useful.'

I asked her whether it was true, that many of the vegetables, now common in kitchen-gardens, have been brought from other countries.

'Yes,' said she, 'several of the most useful species have been brought from Asia into Europe, and in the course of two thousand years have been gradually spread over it—in former times by the Greeks and Romans, then by the Crusaders, and, more recently, by the direct means of navigation; and these again have passed on to America, to which we have given all our vegetable treasures.'

I asked if America, which abounds in delightful plants, has given anything useful in return to Europe.

'Yes,' said my aunt, 'one plant in particular, which is so useful that its cultivation is almost universal. In this country it makes so important a part of the food of millions, that I think it better deserves the name of "the hundred ounces of gold" than the famous Peony-tree, called in China *Pe-hang-king*, which has that meaning on account of the enormous price given for it.'

I could not help interrupting her to say, I was sure that was what Mrs. Barbauld alluded to in the line,

And China's groves of vegetable gold.

She smiled and went on:—'The American plant I speak of, is no longer curious, nor high in price, though it is in value. Can you guess what it is, Bertha?—it is a native of Peru, where, however, it does not seem to grow with half the luxuriance that it does in Europe.'

'I believe, aunt, you mean the potato.'

'Yes,' said my aunt, 'the potato. It was first brought to England by a traveller, more as a specimen of the vegetable productions of other countries, than with any view of bestowing an extensive benefit on society. And thus it is, my dear, that all things really useful are diffused over those parts of the globe to which they are at all suited. While man is occupied in gratifying his love of conquest, his curiosity, or his avarice—while he is searching after the hidden treasures of the earth, or trafficking for the sake of gain, Providence employs those worldly passions and pursuits to dispense blessings and comforts to all nations.'

'I suppose, aunt,' said I, 'that when people settle in new countries, all that is useful amongst us is gradually introduced there.'

'Yes, my dear,' said she, 'both the moral acquirements and the natural productions of the parent countries are spread throughout the world by colonies. Emigrants of

different nations meet, and blend those customs in which some are superior to others; and thus proceeds the slow but sure improvement of the great families of the earth.'

I said that it would be amusing to trace the gradual changes of those great families, and the progress of nations from one country to another, by the similarity of customs.

'Nothing could be more useful or entertaining than such an inquiry,' replied my aunt; 'but in consulting the historian on those subjects, you must take the traveller to your assistance: they each throw light on the other; and each becomes doubly interesting, when we read with the view of comparing the past and the present, and of tracing the progress or the failure of arts and civilization.'

And now, dear Mamma, I smile when I think of your reading this philosophic page in my journal. So, adieu, for this day!

17th.—In these fine evenings there is a soft calmness in the air that is delightful; last night we enjoyed it till the sun's last faint rays had retired, and not even a streak of red appeared in the west. Before we came home I had the pleasure of seeing the glow-worms light their little lanterns—

Stars of the earth and diamonds of the night.

But, I must say, our fire-flies of Brazil are much superior to them in brightness. Indeed, all the productions of nature here are less brilliant; the birds, insects, and flowers of Brazil are quite dazzling, compared with the dull things that I see in this country. But I am told that this deficiency in beauty is more than made up by some greater merits. For instance, the singing of the birds here in spring is said to be so sweet and so various, that I feel a little childish impatience for their singing-time to return, that I may hear them. I am, however, already acquainted with the robin redbreast. I have repeatedly heard its plaintive autumn song.

I never rightly understood till now that the glow-worm is the female fire-fly, though it looks just like a worm, and does not fly. My aunt showed me to-day that this insect, though it possesses neither wings nor *elytra*, and differs but little in appearance from a caterpillar, is, notwithstanding, an insect in the last or perfect state: the head and *corselet* are formed exactly like those of the male,

who is furnished with both elytra and wings. My aunt also showed me that under the last ring of the body there are two very small reservoirs of a thick oily fluid of the nature of phosphorus, which, if the animal is killed, continues to give light till it becomes dry. It is a slow-moving creature, I am told, and seems to drag itself on by starts or slight efforts.

My uncle says that in the *Philosophical Transactions* for 1684, there is a paper by a Mr. Waller, describing an English flying glow-worm, which he observed at Northaw, in Hertfordshire, the light of which was so vivid as to be plainly perceived even when a candle was in the room.

Mary put a common glow-worm into a box of transparent paper with some grass and moss, two days ago, and when we went to examine it last night we saw its beautiful light illuminating every object within a small space around it.

When I saw the glow-worm shining on its mossy banks, I amused myself in imagining how many other living creatures were perhaps lighted by its soft beams. The various beetles, which seem at all hours running to and fro; the slugs, which are for ever in one's path; and the numerous family of spiders, who are so industrious, that they must, I suppose, work 'by midnight lamps.' The moth tribe, also, who seem to love light only at night, can please themselves at this little lamp, without injuring their delicate wings; and I must not forget the little airy beings, of whose histories I am so fond—the fairies—who say so prettily—

And when the moon doth hide her head,
The glow-worm lights us home to bed.

Frederick and I were devising various expedients for making the light of the glow-worms and fire-flies useful; when Mary, who heard us, told me that at Cape Comorin there are certain birds that build pendulous nests; and that it is a fact that these nests are lighted, at night, by fire-flies: the bird fastens a bit of clay to the top of the nest, and sticks a fire-fly on the clay, as if to illuminate the dwelling, which consists of two chambers; but the real object is, probably, to deter the bats from approaching, as they kill the young of these birds. This is mentioned in the life of Dr. Buchanan, who says that the blaze

of light dazzles the eyes of the bats. A friend of my uncle's has written some lines on the glow-worm, which I will copy here.

TO THE GLOW-WORM.

THOU little gem of purest hue,
That, from thy throne o'erapread with dew,
Shedd'st lustre o'er the brightest green
That ever clothed a woodland scene,
I hail thy pure and tranquil light,
Thou lovely living lamp of night !
Thy haunt is in the deepest shade,
By purple heath and bracken made :
By thee the sweetest minstrel sings
That courts the shady grove ;
O'er thee the woodlark spreads his wings,
And sounds his notes of love.

Companion of the lights of heaven !
Thine is the softest breeze of even ;
For thee the balmy woodbine lives,
The meadow-grass its fragrance gives ;
And thou canst make thy tranquil bower
In Summer's sweetest, fairest flower.
The hour of peace is all thy own ;
Thy lamp is lit for one alone ;
Shedding no transitory gleams,
No rays to kindle or destroy ;
Constant, innocuous—still it beams
The light of life, of love, of joy.

My aunt has been so kind as to permit me to make an extract from my cousin Hertford's last letter to her. I enclose it with my journal, which my uncle is going to dispatch to-morrow.

'At last I have overcome every obstacle ; and have visited Staffa and its curious caves.

'The natural columns of basalt, near the landing-place, lie in so many different directions, that I cannot give a clear notion of them—erect, oblique, and horizontal ; and sometimes in each of these positions they are curved. In the first cave which occurs, the columns are bent in such a manner as to have given rise to its name of the *scollop* ; but I think they look still more like the inside of the timbers of a ship. On the other side, the wall which leads into the cave is formed by ends of columns, which make it appear something like a honeycomb ; and immediately beyond this cave, the broken ends form a sort of stairs to the causeway, and up to the great cave. Beneath this part

of the cliff is situated a single rock, called *Buachaille* (the herdsman), a name commonly applied in the Highlands to remarkable mountains and rocks. There is a very striking coincidence between the Gaëlic and the Greek languages, not only in this, but in other words; and my companion, who is well acquainted with the Gaëlic, thinks that they must have had a common origin.

‘Of the three caves in the south-west side of the island, the westernmost is called the cave of Mackinnon; who seems, from the number of places to which he has given his name, to have been a hero of considerable celebrity. Its height is 50 feet, and length 224 feet; but although grand and sublime in general effect, it has not the beautiful regularity so remarkable in the cave of Fingal, which I will now endeavour to describe

‘The opening into this celebrated cave finishes above in a sort of Gothic arch, which is 66 feet above the surface of the water. The breadth, at the entrance, is 42 feet; the whole length of the cave 227; and the height within from 40 to 50 feet. The sides, like the front, consist of groups of columns; and the ceiling, at least towards the middle, is composed of the sections, or broken ends of columns, which give it a very architectural appearance. The sea never ebbs entirely out, and, therefore, forms the only floor of the cave; but the broken range of columns which produces the exterior causeway, is continued on each side within, and admits of access over the broken summits to the further end, if the water be not too high.

‘After all, it is so impossible to describe this cave, that the very attempt is presumptuous.—The more it is studied, the greater is the admiration of the beholder. The richness arising from the multiplicity of the parts—the great extent—the twilight gloom—the varying effects of the reflected light—the transparent green of the water—the echo of the surge rising and falling—and the profound solitude of the whole scene, must make a strong impression on any mind at all sensible to beauty in art or nature. I only wish you could all have seen it, my dear friends.’

18th.—This has been a most charming day; the mild calm dry feeling of the air reminded me of the lovely weather that we are accustomed to at Rio. Here the days are very changeable; but then the nights have not that extreme chilliness that they have in Brazil.

It was resolved, at breakfast, in order to show me a little of the country, that we should take a long walk—visit a farmer who lives about a mile and a half from this—and then return by a different way, through a hamlet inhabited by some of the poorest class.

We were all ready at one o'clock, which was the appointed hour.—My uncle dislikes very much that people should not be ready in time, and considers it a real fault not to be punctual; he says it shows a selfish disregard of the wishes of others, and besides, that a great deal of time is wasted—melted away by waiting for each other.—I hope I shall learn to be more exact than I used to be when with my indulgent mother.

We walked through several fields; but they all had a confined appearance, from being so much more fenced than the open country to which I have been accustomed. Some were all life and bustle; the reapers cutting the corn with their sickles, and dexterously laying it in a line, so that the binders who follow them can tie it up into sheaves without delay; several of these are then made to stand endways, in a little tight group, called a shock. In another place, horses and waggons were engaged in drawing home the corn which had been reaped first, and was now dry enough to preserve it, to the farm-yard, where it was to be stacked; and they were succeeded by many little girls, who were gleaning the scattered ears. Farmer Moreland was in his farm-yard, overseeing the stacking of his corn, and I could not but admire the neatness and regularity with which the sheaves were placed, with the tops pointing towards the centre, all being made quite firm, and the outside of the stack kept perfectly even. My uncle made me also observe that open passages, for the circulation of the air, were left in the stack, to prevent its fermenting or *heating*, which would spoil the grain. What a curious thing it is that decaying vegetables, when thus pressed together, without a free passage of air, should produce such a chemical change as to cause them to take fire!

After we had rested ourselves in Farmer Moreland's comfortable house, we looked at his garden, where I observed several rows of large sunflowers, with the seed of which he feeds his fowls; and we then left him and Dame Moreland, as we saw they were very busy.

In the nice smooth green fields which we passed

through, there are no beautiful flowers, like those which spread a brilliant carpet over our plains ; nor is there any of that rank grass, nearly the height of a man, so common in some parts of Brazil. The hay was all made up some weeks ago, so that I cannot see the delicate flowers of the grasses, nor their slender stalks or *culms*. My aunt says, that grass contains a great deal of very nourishing sugary juice ; and if the hay is cut and made up early, before that juice is exhausted by maturing the seed, it becomes much more strengthening food than when mowed late.

Nor are there any herds of wild cattle here, like those in parts of our country ; and, therefore, the Brazilian custom of catching the cattle by a noose is not in use. I described to Wentworth the dexterity with which the *peons* fling the noose, or *lasso*, over the head of any animal, even in full gallop. Here the cattle are in small numbers, and submit readily to the restraint of being confined in fields. The person who takes care of them has comparatively little trouble ; and though he does not live on beef for every meal, like the peon, yet he is in fact more comfortable. We saw some very poor people in the hamlet by which we returned home, and found them civil in their manners, and contented with their employment. As to their houses, they are very different indeed from the peon's hovel of upright posts, interwoven with branches of trees, and plastered with mud, thatched with nothing but long grass, and a hide stretched on four sticks, by way of a door.

I was surprised to see with what docility a number of cows allowed themselves to be driven home by a little boy to Farmer Moreland's. My uncle told me, that it is a great relief to them to have their milk taken away ; and that, were the fields open, they would go home at the regular hours to be milked. I had imagined that cows had but a small portion of sense or instinct ; but my uncle told me several instances of their sagacity, and among others, one which he read lately in travels in Norway and Lapland.

The author frequently saw cows feeding close to precipices several hundred feet high, where an English cow would have but little chance of escape ; but the Norwegian cows, turned out amidst the mountains to procure the subsistence, become as nimble as goats, and climb the rocky crags with the greatest ease.

The manner in which instinct has taught them to descend the mountains is curious. Sitting on their haunches, they place their fore-feet close together, and in this way slide down places, which from their steepness would appear quite impassable, with safety.

We went into several cottages belonging to the poor labourers. They are either built of brick, or of frame-work filled in with bricks and plaster, with good doors and glass windows; and within, everything, though showing poverty, gave the idea of comfort. The walls papered, or nicely whitewashed; the floors scoured and sprinkled with sand; plates, cups, and saucers displayed on shelves; beds with clean patch-work quilts; and in two of the houses wooden clocks, to call the people up to their business;—and to all of them there was a detached shed for the pig, unlike the filthy place left between the posts that support the floor of the Brazilian huts. In the last cottage we visited, we found that the hospitable people it belonged to had contrived to make room for a poor traveller and her child. She had come there on Saturday evening, when they gave her lodging for charity. On Sunday she begged permission to remain, because she did not think it right to travel on that day; and on Monday she grew ill, and has been in bed ever since. These good people seemed so kind and generous to her, though very poor themselves, that my aunt is much interested for them.

How gratifying it is to see the poorest people assisting each other, even when really distressed themselves; but the most delightful thing of all, dear Mamma, is that there are no slaves here; every body is free, and may work or be idle as they like! But if they prefer idleness, they must of course want the comforts possessed by the industrious; for industry, as you used to say, brings comfort and happiness.

19th.—This forest of Deane is very extensive, I find, for it is nearly twenty miles long, and ten broad. Here, at the south-east, it is bordered by the Severn, and on the north-west it stretches to the Wye: so that it forms the chief part of the western district of Gloucestershire. It was once the chief support of the English navy; but the timber is much diminished, in consequence of the iron-works in its neighbourhood, which it supplied a long time with fuel. My uncle says, however, that it has more the appearance of a forest than almost any other in England; and it still contains

many noble old oak and beech trees, besides birch, holly, and underwood. Here and there a few acres, surrounding cottages, have been cleared and cultivated, which make a beautiful variety. These cottages, and some farm-houses which stand upon the forest land, are free from taxes, and belong to no parish.

My aunt says it is quite remarkable for the quantities of primroses and lilac wood-sorrel that are every where found. There are a few deer in some parts of the forest, but I have not yet seen them.

20th.—What a difference between this country and that which I have left! I scarcely know which to call my own: should it not be that where I lived during my happy childhood with my dear Mamma? The kindness and affection of all my friends here will, I am sure, soon make this country dear to me also; but beautiful I can never think it, when I recollect Brazil, and all its various charms, and all the innumerable flowers and trees that are at this moment in brilliant beauty; while here, the principal flowers are all gone by, and symptoms of the decay of autumn already appear.

It was just about this season that you used to take us to the cottage you had on the Lagoa de Bodingo Freitas. What various amusements we had there! The road along the slope of the mountain was so pretty, among myrtles, *begonias*, and *paullinias*; and there we were always sure of finding the diamond-beetle; and then, when gradually descending from the hill, we drove along the banks of the sea covered with lofty ferns; and when you used to allow us to stop on the shore, and search for sea-stars, urchins, shells, and plants—Oh, those were happy times! Or when we used to go with you to the low grounds near the lake, and lose ourselves in the thickets of *mangrove* trees, while gathering their curious seeds, and wondering at the long roots they shoot out to the ground, and while you were searching for marsh plants and fern bushes. Indeed, I never, never can forget those days; nor the still solitude of the valley, the beauty of the rock of Gavia, covered with the *gloxinia*, and the wild mountain-stream that came piling down into the lake; nor the poor fishermen who would look so happy when you gave them a few *reals*. cows, turn, we live here on the borders of a forest, it is quite subsistence, forest near which the Senhor Antonio Gomez rocky crags, here we used sometimes to spend a few weeks so

pleasantly. I miss several little things that seemed to me to belong to a forest, and which used to amuse Marianne and me so much—the howling of the monkeys in the wood, that wakened us in the mornings, and the deep noises of the frogs and toads, with the chirp of the grasshoppers and locusts, like a monotonous treble mixed with that croaking bass. And then, when playing about in the wood, after the mists of the night had been dispelled by the rising sun, and when every creature seemed to be rejoicing in the return of day, we had such delight in chasing the pretty butterflies : nothing at all here like those great butterflies that used to flutter from flower to flower, and hover among the bushes under which we sat ; or that sometimes collected in separate companies on the sunny banks of the little stream that ran through the valley near the Senhor's house. None of those great owl-moths sitting quietly on the trees waiting, with their wings spread open, for the approach of evening. Alas ! I see none of those beautiful creatures here ; nor the long nests of the wasps hanging from the trees ; nor the beetles sparkling brightly on the flowers and fresh leaves ; nor the beautiful little serpents, equal to flowers in splendour, gliding out of the leaves and the hollows of trees, and creeping up the stem to catch insects.

I have just been describing to Mary those woods, which seemed actually alive when the monkeys came leaping and chattering from tree to tree, and enjoying the sun ; as well as all our birds with their bright plumage, whose various notes formed such extraordinary concerts—the *urapong*, which makes the woods resound with a noise like the strokes of a hammer on the anvil—the showy parrots of every colour, and the *manakin*, whose melodious morning-song you loved, because it was so like the warbling of the nightingale ; and which Mary tells me is called the *organiste* in St. Domingo, on account of the compass of its song, as it forms a complete octave. And besides all these, the dear little busy *orioles*, that my sister and I have so often watched creeping out of the little hole at one side of their long bag-shaped nests, to visit the orange-trees, while their sentinels gave them notice by a loud scream of the approach of strangers.

Mary smiled when I told her—what I am sure Marianne remembers—how we used to like to listen to the *toucan* rattling with his large hollow beak, as he sat on the outermost branches, and calling, in plaintive notes, for rain ; and

how sometimes, when he was sitting comfortably and almost hid in the nest which he had scooped in the stem of a tree, we used to pretend to alarm him, that we might see how instantly he prepared to attack the invader with his bill.

But these are all passed away. Dear Mamma, forgive this list of pleasing recollections: describing them to you makes me feel as if I was again enjoying them in your company. There is such a glowing splendour, as I told Mary, in the sunny days of Brazil, when the glittering humming-birds dart about, and with their long bills extract the honey from the flowers, that I cannot avoid perceiving how gloomy everything appears here; but pray do not think me discontented.

Mary, to whom I had been describing all these past delights, came back to me just as I had written so far; and seeing the tears in my eyes, she seemed to feel with me, and to think it quite natural that I should every moment perceive the difference between two countries so opposite in climate and in everything—though she laughed a little at my repeating to you all that you see continually; but you know, Mamma, you desired me to write all I thought, and you may well suppose how constantly my thoughts turn towards the country in which you live.

Mary said she should have been surprised if I had not felt the change. 'But indeed, Bertha,' said she, 'you must not forget how well balanced are our blessings. If Brazil has a climate and various beautiful productions which England does not possess, England, on the other hand, has far more substantial comforts; and, by her commerce, she has the means of enjoying those of all other countries. We have not your brilliant flowers and birds, but you will find that we have many which are more useful, and which will interest you, who love natural history. Our birds have no pendent nests, because they are in no danger from such predators as your monkeys and snakes, and therefore their instinct does not leave them to contrive such means of defence; but you will see, among both our birds and insects many whose habits are equally curious.'

I said that I believed, as you, Mamma, have often told me, that there is no country which does not possess much to attach its inhabitants to it, and to interest an observant mind. 'And it is in the mind,' she replied, 'that our happiness will always be found. It rests on our own c

position and thoughts, much more than on those outward circumstances which appear coloured by our feelings: just as objects appear the colour of the glass through which you look at them. But,' added she, 'I came not to moralise, but to beg of you to come out and walk.' Out we went; and my thoughts soon turned from the scenes I had been lamenting, to the satisfactory feeling of having, in both my countries, such dear and good friends.

WEEK 3.

On the Sabbath-day—Bertha approved by her Uncle—Basket-maker—North Rona—Salt Plain—Salt Cliffs—A Brazilian Evening—Harvest-home.

21st.—*Sunday.* In the course of a conversation this morning about the Sabbath-day, a lady, who is here on a visit, remarked, that it was the idea of some people, that the Sabbath, having been instituted at the time that the Israelites received the Ten Commandments, is not binding on Christians, any more than the other Levitical institutions.

In order to show what a mistaken idea that is, my uncle read to us the extract which I am going to copy here.

'It is a great mistake to consider the Sabbath as a mere festival of the Jewish church, deriving its whole sanctity from the Levitical law. The religious observation of the seventh day is included, in the Decalogue, among our first duties; but the reason assigned for the injunction is general, and has no relation to the particular circumstances of the Israelites, or to the particular relation in which they stood to God as his chosen people. The creation of the world was an event equally interesting to the whole human race; and the acknowledgment of God as our Creator is a duty, in all ages and countries, incumbent on mankind.

'The terms of the ordinance plainly describe it as an institution of an earlier age—"Wherefore the Lord blessed the seventh day, and *set it apart*," which is the true meaning of "hallowed it." These words express a past time. It is not said, Wherefore the Lord now blesses the seventh day, and sets it apart, but, Wherefore he *did* bless it, and set it apart in times past; and he now requires that you, his chosen people, should be observant of that ancient institution. In confirmation of this fact, we find, by the 16th chapter of Exodus, that the Israelites were already ac-

quainted with the Sabbath, and had been accustomed to a strict observance of it, before Moses received the tables of the law at Sinai. For, when the manna was first given for their nourishment in the wilderness, they were commanded to lay by, on the sixth day, a sufficient portion for the succeeding day. "To-morrow," said Moses, "is the rest of the holy Sabbath unto the Lord: on that day ye shall not find it in the field; for the Lord hath given you the Sabbath, therefore he giveth you on the sixth day bread for two days." He mentions the Sabbath as a divine command, with which the people were well acquainted; for he alleges the well-known sanctity of the day, to account for the extraordinary supply of manna on the preceding day. But the appointment of the Sabbath, to which his words allude, must have been earlier than the appointment of the law, of which no part had yet been given. For this first gathering of manna was in the second month of the departure of the Israelites from Egypt; and they did not arrive at Sinai, where the law was given, till the third month.

'An institution of this antiquity and importance could derive no part of its sanctity from the authority of the Mosaic law; and the abrogation of that law no more releases the worshippers of God from a due observation of the Sabbath, than it cancels the injunction of filial piety, or the prohibition of theft or murder.

'The worship of the Christian church is properly to be considered as a restoration of the patriarchal church in its primitive simplicity and purity; and of the patriarchal worship, the Sabbath was one of the noblest and simplest rites. As the Sabbath was of earlier institution than the religion of the Jews, so it necessarily survives the extinction of the Jewish law, and makes a part of Christianity. It differs from all other ordinances, of similar antiquity, and is a part of the rational religion of man in every stage and state of his existence, till he shall attain that happy rest of which the Sabbath is a type.

'Let us remember, always, that to mankind in general and to us Christians in particular, the proper business that day is the worship of God in public assemblies. Private devotion is the Christian's *daily* duty; but the peculiar duty of the Sabbath is public worship. Every man's conscience must direct him what portion of the remainder the Sabbath should be allotted to private devotion, usef

duties, and sober recreation. And, perhaps, a better general rule cannot be laid down than this—that the same proportion of the Sabbath, on the whole, should be devoted to religious exercises, public and private, as each individual would employ, on any other day, in ordinary business.’

22nd.—I have just been made very happy, dear Mamma. I was sitting in my aunt’s dressing-room, labouring through a difficult question in arithmetic which Mary had given me, when my uncle came in; and, after a little conversation, he said to my aunt and cousins, ‘I am very much pleased with this good girl; I have not judged of her hastily; I approve of her as a companion for my daughters; and she has my free permission to be with them in this room and everywhere, as much as she pleases.’

It made me very happy to perceive that my cousins looked as much pleased at this as I did; but they could not feel the delight that I felt, when he continued—‘Bertha, my dear, when you write to your mother, I desire that you will say I am highly pleased with her education of her little daughter. Separated from her friends and country by ill health, with little of good society, and labouring under many disadvantages, she has not sunk into indolence or indifference—she has preserved her good sense and energy, and has made you a gentlewoman in mind and manners; and I rejoice to see you so much what the child of my excellent sister ought to be.’

My beloved mother, this little message to you gave me such heartfelt delight, that my eyes very nearly overflowed.

My kind uncle afterwards said, ‘But, Bertha, do not imagine that I think you have no faults.’ ‘No, dear uncle,’ I said, ‘that never came into my head; but I am sure you and my aunt will be so good as to assist me in conquering them.’ ‘Most readily I will,’ said he: ‘indeed I will write myself to your mother, and tell her how much I like her Bertha, who deserves to be the companion of my daughters; my sister knows how particular I am about their intimacies and early friendships.’

Though I know his letter will be a most welcome one to you, I could not resist the pleasure of telling you all this myself, dear Mamma. I shall feel much more bright and cheerful now than I have felt since I left you.

23rd.—I can walk much more here than I could in our own hot country, so I am out a great deal every fine day.

Yesterday we all set out on a ramble through the forest, that I might see some of its wildest parts ; and the morning was so fine, that we went much farther than my cousins had been for a long time. There is but little of it that answered to my ideas of a forest : some parts are quite cleared away, and in others the trees are spoiled by being copped. I must confess, that some of the oaks are fine trees ; but how insignificant the best of them would appear by the side of our noble *bombax*, or of our tall palms, which spread their leaves like immense umbrellas. And, besides, the green of the foliage is so dull, when compared to the vivid tints of the trees in Brazil ! We found, however, some very nice and smooth grassy paths through the wood, of which I might say—

All around seems verdure meet
For pressure of the fairies' feet.

As we walked along one of these, we were surprised by the appearance of smoke curling through the trees ; and we soon after came to a little cottage, in a very solitary part of the forest. Frederick ran on, 'to discover,' he said, 'whether it contained a giant, ready to devour us with *fee, faw, fum*, or some hermit who had retired to this sequestered spot, to expiate his crimes in solitude and silence.'

We soon followed, and instead of either giant or hermit, there was a poor man, almost blind, employed in making a basket, while his daughter, a pretty-looking young woman, about twenty, sat within, engaged in needlework ; and the house, though one of the poorest that I have seen, looked clean and airy. But as it is built against a sloping bank, it must be damp I think ; and his daughter has rather a delicate appearance, and looks pensive, as if she was not in good health.

I was very much interested in observing the method by which he made his basket. It was not made of willow, which I thought was always used. We inquired what the material was, and I was surprised to find that it was oak. He splits the wood into long strips when it is quite fresh or after it has been soaking in water for some time ; the strips are about an inch broad, and being only a tenth of an inch thick, they are so pliable, that he weaves them with difficulty. The shape of his basket was circular, with flat bottom. A sort of skeleton frame is made first, stronger slips of wood ; then the long thin pieces are wov

in and out, close together; and the ends are neatly fastened under each other. It seemed a tedious work; he is to have half a crown for the basket he is now making, for a washer-woman; and as it is more than two days' employment, his gain is but very small. He lost his sight many years ago in the mines; and, though never idle, he cannot easily support himself. I believe his wife is dead. He says he has lived in that place several years; and I understand that the inhabitants of the Forest of Deane have certain privileges in regard to taxes, that make it a very desirable residence to a poor man.

My uncle is to go in a few days to bespeak some of those baskets, and I hope to walk there with him. It will have been very happy for this poor man that we found him; for my uncle and aunt will certainly be of use to him. They assist the industrious very much; and all they do for the poor is done in such a kind and cheerful manner, that it doubles the favour.

24th.—This morning brought another letter from Hertford: it has been delayed on its road, for it was written several weeks ago. Here are some extracts from it; perhaps they may entertain you, as he describes his visit to the little island of North Rona.

'It is accessible in one spot only, and that with difficulty. The landing-place is on an irregular cliff, and you must watch for the moment to jump out on the first ledge of rock to which the boat is lifted by the waves. It is a perilous operation to remove sheep from this island—the animal being slung by the legs round the neck of a man, and thus carried down the face of a rock, where a false step exposes him to the risk of being either strangled or drowned.

'The violence and height of the waves which in winter break over the island are almost incredible. The dykes of the sheep-folds are often thrown down; and stones of enormous bulk are removed from their places, at elevations of 200 feet above the high-water mark. It is inhabited by one family only, who cultivate it, and tend about fifty sheep. Twice in the year, that part of the crop which is not consumed on the farm, together with the sheep's wool and the feathers obtained from the sea-fowl, which these poor people are bound to procure, are taken away by the boat to Lewis; and thus some little intercourse with the external world is preserved. But they are so little accustomed to the appear-

ance of any one but the proprietor of the island, that when we appeared, the women and children were seen running away to the cliffs to hide themselves, loaded with whatever moveable property they possessed, while the man and his son began to drive away the sheep. A few words of Gaelic recalled the men; but it was some time before the females ventured from their retreat, and when they did, the impression they made on us was not very favourable to the progress of civilization in Rona: the mistress of the family would have ill stood a comparison with Iliglaik, whose accomplishments are so well described by Captain Lyon.

'Not even the solid Highland hut can withstand the violence of the wind in this region. The dwelling is, therefore, excavated in the earth, the wall requisite for the support of the roof scarcely rising two feet above the surface; and the whole is surrounded with turf stacks, to ward off the gales. The entrance to this subterranean retreat is through a long winding passage, like the gallery of a mine, commencing by an aperture not three feet high, and very difficult to find. Were it not for the smoke, the existence of a house could never be suspected: indeed, we had been talking to its possessor for some time before we discovered that we were actually standing on the top of his castle. Like a Kamschatkan hut, it receives no other light than that from the smoke-hole; it is floored with ashes, and festooned and ornamented with strings of dried fish. Its inmates, however, appeared to be contented and well fed, and little concerned about what the rest of the world was doing: they seemed to know of no other world than North Rona, and the chief seemed to wish for little that North Rona could not supply. The great object of his wishes was to get his two younger children baptized, for no people are more zealous in the observance of their religious duties than the Highlanders, and even in that dreary solitude this poor man had not forgotten his.'

I am quite established now as one of the dressing-room party. A nice little table has been allotted to my use, and I shall be very comfortable as well as happy.

In the library, I was frequently interrupted in drawing or reading, by morning visitors; but into this charming retired room no visitors are admitted, and we shall seldom be disturbed. My aunt has given me just such a nice little table as each of my cousins has: the top serves as a desk for

reading, or writing, or drawing; and can be raised to any slope, as it is joined by hinges at one side; while on the other side there is a light frame, which supports the book or drawing I am copying, and which, when not wanted, folds in under the top. It has places for pens, ink, and knife, and two drawers, besides many other conveniences. Indeed, I must be happy in this room, where a variety of useful and agreeable things, and much gaiety too, are always to be found.

I wish, Mamma, you could know your nieces: there is a nice mixture of gaiety and steadiness in both. Mary would be almost perfect, if she were not too timid. Caroline is the handsomest—she has such a fresh, bright complexion, and such pretty waving ringlets; yet she never seems to think of herself or her beauty. She is very active and very useful—always punctual, and ever ready to oblige and assist others, to walk out or stay at home with them—to search for a book, or to hunt out a passage in it—to converse, or to remain silent. Yet she contrives to have time for all her own employments, and to lay up stores of knowledge, which are always ready when called for. Her temper is so mild, and her feelings are so much under her own control, that one does not at first see exactly how much she enters into those of other people; but every day her character has opened more and more to my observation.

Grace is a dear, little, animated creature—very obedient in general, very intelligent, and my uncle's play-fellow, but never spoiled. What a pity you cannot see all these children of a brother you love so much! My aunt often expresses her anxiety for your return: she says that, if my uncle and she had their dear sister within reach of them, their family happiness would be complete.

I told you before, I believe, that my uncle, and my aunt too, though she does not say much, are not pleased if we are not punctual; and—must I confess it?—yes, I must acknowledge, that several mornings I have been rather late for breakfast. My uncle has been very patient, however, and says he will make allowance a little while for the indolent habits I have acquired by living in a warm climate, and with 'too indulgent a mother.'—So, good night; I have been writing when I ought to have been in bed.

25th.—There was a good deal of conversation about salt and salt-mines to-day. My uncle asked me if there were

many such salt-marshes in Brazil as abound in North America, and of which cattle are so fond. I forgot at first, and said, very foolishly, that I could not tell: I was in a silly fit, till at last I recollected myself, and told him I had heard that there were some, though they are obliged to import a great deal of salt. What an extraordinary appearance a salt-plain must have, where the salt is open and uncovered! When we went upstairs, Mary showed me Mr. Salt's description of one in Abyssinia. He says that some of his party and Mr. Coffin 'stopped at the edge of an extensive salt-plain to refresh themselves, under the shade of a group of acacias, near some wells of fresh water. At this place they were provided by the natives with a sort of sandal, for walking on the salt, made of the leaves of a dwarf-palm.

'The plain lies perfectly flat, and is said to be four days' journey in length. The first half mile was very slippery, and the feet sank at every step into the mud. After this, the surface became strongly crusted, resembling in appearance a rough coat of ice, covered with snow.

'On the *Assa Durwa* side of the plain, a number of Abyssinians were engaged in cutting out the salt, which they accomplished by means of a small adze. The salt lies in horizontal strata, so that when the edges are once divided it separates without any great difficulty: that which is immediately under the surface is exceedingly hard, white, and pure; but as the workmen advance deeper, it becomes of a coarser quality, and much softer. In some places it continues tolerably pure to the depth of three feet, below which it becomes mixed with the soil, and consequently unfit for use. This salt-plain, from which the whole of Abyssinia is supplied, is infested by a cruel race, who make it a practice to lie in wait for the individuals engaged in cutting it. These poor fellows, in the absence of their guards, lie down flat on the surface, when working, that they may escape the observation of their barbarous enemies, and on the approach of a stranger they run in alarm to the mountains.'

When we had finished reading this extract, Mary said that since I was so much amused by it, she would find description of some curious salt-cliffs on the banks of the Indus.

'Near Callabaugh, on the banks of the Indus, the road cut out of the solid salt, at the foot of salt-cliffs which, in some places, are more than 100 feet high above the river

The salt is hard, clear, and almost pure ; and would be like crystal, were it not a little streaked and tinged with red. Several salt-springs issue from the rocks, and leave the ground covered with a crust of the most brilliant whiteness. The earth is blood-red ; and this, with the beautiful spectacle of the salt-rocks, and the Indus flowing in a deep and clear stream, through lofty mountains, presented a most singular scene.*

I have copied these for Marianne, for I am sure you have neither of the books.

26th.—I have been out till very late this lovely evening, which was so calm, and still, and fragrant, that it made me think of some of our own evenings ; and the brightness of the stars, and the clear blue sky, increased the resemblance. While walking, I described to Mary and Caroline the country-house of the Condé de San Lourenço, on the slope of the hills which extend from the city towards the south-west ; and the fine view, from that spot, of the city and part of the bay. I endeavoured to make them understand the beauty of our evenings, after the sultry day, when the *mimosas*, that have folded up their leaves to sleep, stand motionless beside the dark *manga*, *jaca*, and other trees ; or, if a little breeze arises, how it makes the stiff, dry leaves of the *acaju** rustle, and the myrtles drop a fragrant shower of blossoms ; while the majestic palms slowly wave their crowns over all.

My cousins appeared so much interested, that I endeavoured to complete my picture of a Brazilian evening. I described to them the shrill cries of the cicada, and the monotonous hum of the tree-frog : the singular sound of the little animal called the *macue*, which almost resembles a distant human voice calling for help ; the plaintive cries too of the sloth, and the various noises of the *capuira*, the goat-sucker, and the bull-frog ; along with the incessant chattering of the monkey tribe ; while myriads of fire-flies, like moving stars, complete, as you used to say, the beauty of our evenings. I did not forget to mention those palms, whose flowers suddenly burst out in the evening, and join their fragrance to that of the orange-groves. Indeed, all these things were so strongly pictured in my mind, that I could almost have thought myself walking amongst them.

Caroline, in her ardent manner, expressed a wish to visit this interesting scene, but quiet Mary repeated a few stanzas

* The cashew-nut.

of a poem supposed to be written by a European in South America. Two of them are particularly applicable:—

In the silence and grandeur of midnight I tread
Where savannahs in boundless magnificence spread;
And, bearing sublimely their snow-wreaths on high,
The far Cordilleras unite with the sky.

The fern-tree waves o'er me—the fire-fly's red light
With its quick-glancing splendour illumines the night;
And I read, in each tint of the skies and the earth,
How distant my steps from the land of my birth.

27th.—I do not wonder at the attachment you feel, Mamma, to this place: it is, indeed, very pretty. These wooded banks, and green lawns and fields that slope towards the Severn, and form such a lovely view from some of the windows! But there is no view so pretty to my fancy, as that from the little bedchamber which my aunt has been so kind as to allot to me. I have a glimpse of the river and its woody banks; and very near my window there is a group of laburnums, and an old fir-tree, in which there are numbers of little birds, that I amuse myself in watching. I am very fond of sitting in the projecting bow-window, also, at the end of the library: I call it the poetical window, for all that you see from it suits the feelings that descriptive poetry excites. By the way, I must say that I can read THOMSON'S *Seasons* now, and other descriptive poetry, with much more pleasure than I could before I came to England, because so much of the scenery described was unknown to me, and so many of the rural occupations I had scarcely seen.

I shall now remember, much better than I used to do, some of your favourite descriptions, that I have learned over and over again. My aunt says, that it has been remarked by a philosopher who has written a most interesting book on the human mind, that in descriptive poetry we always remember best those scenes which we can picture to ourselves. I am sure this is the case; for now, as I begin to understand the allusions, it requires but little effort to recollect those beautiful lines of Thomson on harvest-home.

When I came here, several of the fields were still un-reaped: all is now cut, dried, drawn home, and stacked and the fields only show, by the yellow stubble remainin in the ground, what treasures gilded the earth but a sho time since.

All the farmers in this neighbourhood have finished th

harvest; and my uncle took me again to Farmer Moreland's, that I might see the whole of the process. The stacks, I see, are placed on stands, formed of stone pillars, with a projecting cap of flag-stone, so that the corn has a free passage of air underneath, and is out of the reach of rats.

Farmer Moreland is one of the most comfortable farmers in this part of the country; and being an old, experienced man, and very much respected, he seems to be considered at the head of the yeomanry. Every year, when his great harvest is well secured in his farm-yard, he gives a feast to all his labourers and the neighbouring farmers; and, when he saw that we were so much interested, he very civilly said to my uncle, 'If so be the young ladies would like it, and if you have no objection to a little mirth or so, they shall be heartily welcome to see my harvest-home, on Saturday, at three o'clock.'

We were all delighted to go, and have had a lovely day for it. We walked through the little beech-grove and the pretty fields to the farmer's; we found all his labourers and their families assembled, dressed in their Sunday clothes. The farmers' wives and daughters amused me by the varieties in their dress: some in fine flourishing caps, with broad ribbons and borders, and flounces in imitation of the squire's lady; and others, plain, clean, and tidy.

There was a very plentiful dinner, set on tables under a clump of trees; and the good farmer seemed to feel real delight in making his hard-working labourers eat heartily. Two fiddlers were playing all the time to enliven them; and the ale and cider were abundantly circulated. When the repast was finished, the more active sports began; and nothing could be prettier than the different groups of dancers, or more laughable than the attempts to jump through a ring and hop in a sack. Under the trees most of the older people sat comfortably, talking; though some, excited by the general joy, took part in the dance, and others presided at a wrestling match. Each of those men who had been more particularly engaged in getting in the harvest, had his hat ornamented with a large bunch of wheat; but the leader, or captain of the sports, was actually crowned with a whole sheaf. He was carried round the tables on the shoulders of his comrades, and the sports began by dancing round him in a general ring; at last he gave the signal, when they suddenly separated, and each fixed on his favourite damsel

for the dance. Dame Moreland gave us some nice syllabub; and we left her and her happy guests in the midst of their merriment.

My uncle met there an old acquaintance, whom he had not seen or heard of for several years. When he knew him, this gentleman was in the fashionable world, but now he seems completely a farmer. He is much altered: my uncle did not recollect him; but he had so much the look and language of a gentleman, that my uncle's attention was attracted. His manner, to the inferior society he was with, was mild and good-humoured, without any appearance of proud condescension, or of too great familiarity. My uncle spoke of him two or three times on our way home, as if he was surprised at finding him in his present situation.

WEEK 4.

Character of the Christian Religion—Story of Bessy Grimley—Bengal Gross-beak Accomplishments—Education—Float described by Herodotus—Isle of Skey.

28th.—*Sunday.* My uncle was speaking this morning of the general character of the Christian religion, as being so directly contrary to fanaticism and imposture. This is particularly marked, he says, by the manner in which it explains the obligations that arise from the different relations of civil society. He remarked that 'the chief object of every religious system, founded on imposture, has been to use its spiritual influence in acquiring political authority, and to consecrate the legislator by investing him with the sanctity of the priest or the prophet. But Christianity, in this respect, in its original simplicity, stands totally free from all suspicion. The kingdom of our Saviour and his apostles was, literally, "not of this world;" and in no instance whatever did they claim or exercise any degree of political power, or encroach, in the least, on the authority of the magistrate. Christianity released none from their duties, public or domestic: they were still to be discharged by all persons, and not only with equal fidelity, but with more exalted views; no longer as "pleasers of men, but as servants of God."'

'It seems almost surprising,' said my aunt, 'that enthusiasm, or rather bigotry, should ever have crept in among the professors of a religion that is so mild and so moderate in all its doctrines.'

‘Every line of the gospel,’ said my uncle, ‘expresses the same calm and merciful spirit, with which our Saviour checked the intemperate zeal of his disciples, who would have called fire from heaven on the Samaritans, for refusing to receive him. And take notice, that his heavenly wisdom not only prohibits every species of persecution, but rebukes all those overbearing feelings which lead to discord of every kind. How strongly do St. Paul’s precepts enforce this forbearing principle! In the language of a heart overflowing with benignity, he says, “Why dost thou judge thy brother? for we shall all stand at the judgment-seat of God. We that are strong ought to bear the infirmities of the weak. Wherefore receive ye one another as Christ also received us.”’

I am very careful, dear Mamma, to write down as much as I possibly can of our Sunday morning conversations, because I know they will interest you particularly; and it is very pleasant to me to trace in these opinions of my uncle and aunt the very same sentiments which you have so often impressed on your little Bertha.

29th.—My uncle went to-day to bespeak some baskets from the blind man whom I mentioned before, and who I found out has a sick old wife, who cannot get out of bed. We all begged of course to accompany him. We found the old man sitting on a little bench at his door, talking earnestly to his daughter. She looked disturbed; and when we spoke to her, I observed that her colour rose and fell rapidly. My uncle asked if she was ill, or if we came at an inconvenient time?

‘No, no, sir,’ said the old man. ‘Bessy, my dear, go in and stay awhile with the old wife, perhaps she may want you.’

My uncle again said ‘that he feared he interrupted them.’

‘No, sir,’ said the blind man, ‘you do not interrupt us; I must work, happen what may; but as you speak so kindly, sir, I will tell you how it is: Bessy Grimley, sir,’ said he, ‘is not my daughter—I have none, sir; but I will say no more of that. It was the will of God to take all my own from me, and I won’t complain; but Bessy is as good a daughter to me as if she had been my own. Some years ago, sir, her father was one of my neighbours: he was Joe Grimley, that you may have heard of, who kept the carrier’s

inn, at the other side, near the town ; I lived there at that time. Well, he broke, poor fellow, and had to go off in the night to hide from his creditors. His wife was taken ill that same night, because of the fright, I believe. She was put to bed, and had a fine little girl ; but she never did any good afterwards, and before a month was over she was gone. The poor woman asked my wife to take care for awhile of her infant, till her husband was no longer under a cloud ; and we promised it, sir, and have kept our promise through all times, bad as well as good. While we were well to do, she had her share of all that my own had ; and then, when times changed, we never forsook her. And now, sir, you see, she is everything to us. When I lost my sight, poverty came fast upon us : my wife soon after lost her health with grief, I believe, and can now do nothing. Our sons went away to the wars, and died in the field of glory ; our two daughters worked too hard, I believe. Alas ! sir, one after another declined away and died. About four years ago, while Bessy was still a young creature—for she is only twenty-one now—a young man, a farmer's son, fancied her, and wished to marry her ; but his father could not give him sufficient maintenance, and the poor girl had nothing, you know. Young Franklin's love for her was of the right sort : he got his father's consent, and he went off to America to make a fortune. He went to the States, sir, and there he found plenty of work and high wages ; and though he was not naturally a thrifty lad, he wisely laid by most of his earnings till he had saved altogether a sufficient sum to buy a farm ; and a few months ago, sir, Bessy had a letter from him, long after, I believe, she had begun to think he had forsaken her. He told her how he had prospered, and that he was going to complete the purchase of his land, and that he hoped, if she was still constant, she would go out to him : "If you will not come to me," said he, "I shall think that you never loved me, and I will try to think of you no more, if I can help it : but if you will come and be my wife, I will love and cherish you, and besides, you shall live like any lady in England."

"Well, sir, the dear child would not leave us—my last daughter, my poor Jenny, had been taken a little before, and I knew not who to get to live with us ; but I pressed Bessy to go at any rate. "No, father," said she, "I owe every thing to you and to mother : you have nursed me and

bred me up, and you have taught me all I know ;—never, never will I forsake you, with your infirmity, or leave poor helpless mother to the care of a stranger. No, no, dear father, God would not send his blessing upon me if I did so. Indeed, I never should be right happy with James, if I forsook you ; and if James Franklin loves me, he will say I have done right.”

‘I will not take up your time, sir, repeating all the arguments I tried with her, but I assure you I did my best to make her take the offer. If you could but know how for months and months she has tended us—patiently assisting the poor old woman night and day, and bearing with the crossness that a suffering creature will sometimes show—often watching by her half the night—always ready in the morning to prepare our meals—many a time assisting me at my work—and, besides, sharing our want of comfort, sir, for often we be hard put to it for a meal. Sir, she does it all with cheerfulness and kindness, and never did I hear a word of complaint from her. She works hard with her needle too, to help to support us, and never seems to think of the riches offered to her. But now, sir, mark this : I have lived long, and I never saw it happen that people who acted with a hearty desire of pleasing God were left without reward. The religion that makes us do what is good, that is what I call true religion, sir, always brings happiness, somehow or other, with it.

‘But I was a-going to say, that this day my poor Bessy had a letter from James, telling her that, from some delay in the business, he had not bought the farm he intended when he received her refusal to go out to him. He says, “he felt a little angry at first ; but he found he could not help loving her the better, and that he would bring his money to England, and be content with a smaller farm, near her own friends, and only work the harder for his excellent Bessy.” He expected to be here about this time ; and what between this sudden news, and the hope of so soon seeing him, and her joy at his constancy, she is a little unsettled, sir, to-day. But I pray God to give them happiness together, and reward her with children that will be to her what she has been to me.’

I have tried to tell you this story in his own words, as well as I could. As soon as my uncle had bespoken the baskets, we came away ; but he desired to be told when

Franklin comes. He was very much touched with the poor man's account of all Bessy's goodness: so much, indeed, that even in repeating it to my aunt, when we came home, his voice quite faltered.

30th.—I have just chanced to discover that the bird which Dr. Buchanan described as fastening the fire-fly to its nest is the Bengal gross-beak. It is very common in Hindostan, where its Hindu name is *baya*. It is remarkable for its sagacity, its pendent nest, and its brilliant plumage.* It is described to be like a sparrow in shape, and in the colour of the back; but the head and breast are yellow. They associate in large communities, and cover extensive clumps of acacia and Indian fig-trees with their nests; and also the *palmeira*, or wild date, on the leaves of which the Bengalese children learn to write. They prefer those trees which hang over a rivulet: the nest is made of long grass, which they weave almost like cloth, in the form of a large bottle. It is divided into three chambers, and is suspended firmly to a flexible branch, with the neck downwards, so as to secure the eggs and young from serpents, monkeys, squirrels, and birds of prey. The eggs of this little bird resemble large pearls.

The *baya* is wonderfully sensible, faithful, and docile, and never voluntarily deserts the place where its young were hatched. It is easily tamed, and taught to perch on the hand of its master; and may be taught to fetch a piece of paper, or any small thing that he points out; and so great is its quickness and dexterity, that if a ring be dropped into a deep well, the bird will dart down with such amazing celerity, as to catch the ring before it touches the water, and bring it up with apparent exultation.

A singular instance of its docility was frequently witnessed by the writer of this account. The young Hindu women, at Benares, wear thin plates of gold, called *ticas*, slightly fixed, by way of ornament, between their eyebrows. Mischievous young men train the *bayas* to go, at a signal given them, and pluck the pieces of gold from the foreheads of the women, as they pass through the streets, and bring them to their employers. They do not sing, but when assembled together on a tree, they make a lively din or chirping; though want of musical talent, however, is compensated by th

* See Forbes's Oriental Memoirs, and Asiatic Researches.

sagacity, in which they are not excelled by any feathered inhabitant of the forest.

There is another species of this family found in Madagascar, which is sometimes called the *toddy* bird: it is very like the one I have described, and fastens its bag, or nest, which is made of straw and reeds, in the same manner, to a branch, over a stream. Though it builds a fresh nest every year, it does not abandon the old nest, but fastens the new one to the end of the last: so that sometimes five may be seen hanging one from the other. They build in society, like rooks, five or six hundred nests being often found on one tree.

Tell Marianne not to confound the tailor-bird with these, as I did, for it is quite different—of a different family, and very superior to the *baya* in beauty; it even resembles some of our humming-birds in shape and colour. There is the prettiest mixture in the male bird of blue, purple, green, and gold. In order to conceal its nest, it first selects a plant, or bush, with large leaves, then gathers cotton, spins it into a thread, by means of its long bill and slender feet, and sews the leaves neatly together, as if with a needle: so that its nest is joined to one leaf, and covered over by the other.

31st.—Mary has been a very patient arithmetical mistress; I have endeavoured to be very diligent; and we are both now rewarded, she says, by my progress. I begin to understand the reason of each process, and there is some hope, therefore, of conquering my difficulties. My uncle said I ought to trample on them—and I resolved to do so—like the boy without a genius in ‘Evenings at Home.’

My uncle frequently puts arithmetical questions to us, which we work in our minds, without the aid of pencil or paper. This requires some exertion, and was very difficult at first; but I already perceive that my attention is much more under command than formerly. Clearness and quickness in arithmetic, he thinks, are not only useful for the management of our common domestic affairs, but improve and strengthen our reasoning powers.

We pass our time here in a delightful manner—there is such a nice mixture of amusement and useful employment. My cousins read a great deal, and have much real knowledge. Accomplishments are not neglected; but my aunt thinks that most people make them of too much importance,

as they should be the *ornament*, not the *object* of our life. Mary says she considers the various things she learns not as tasks, but as the means of enabling her to get through the business of life with pleasure and success; and that were she to call them lessons, she should feel as if they were to be laid aside with childhood.

That reminds me of what my uncle said just after I came here: 'At your age, Bertha, all you learn must be voluntarily acquired, not hammered into your head. Whether it be science, or history, or languages—whatever you learn, try to feel an interest in it; you will then apply with energy, and what is acquired in that way will always be liked. Music and drawing are valuable pleasures; but they are only pleasures: never forget that your mind is to be cultivated; and that if a part of each day be not employed on objects of a higher and more useful nature, you are only preparing yourself for a trifling, selfish life.'

I shall think of this advice every day; but I assure you, dear Mamma, that I will not neglect any of those things you used to encourage me to learn.

My cousins have no governess, and yet my aunt says she has never found teaching them by any means laborious. She says, the chief part of education is to make children comprehend the difference between right and wrong—to teach them self-command—and to give them a love for rational occupation; and then they do not require to be watched. You would be surprised to see how much they accomplish in the course of the day; and yet they always seem at liberty: everything is done methodically. Besides their regular employments, many things are done privately without any show—such as visiting the poor, and attending a school for poor children, which my aunt has established. It is in a small white cottage, about five minutes' walk from the shrubbery. My aunt or my cousins visit it frequently; and I go there sometimes. I forgot to tell you in the right place, that I sing every day. We are all three just now learning the glee of 'Hark, the Lark,' that we may sing it on my uncle's birth-day. Caroline takes the tenor—she has a very good voice.

Sept. 1.—Last night my uncle read a paragraph to us, from Ker Porter's travels, as a curious instance of the permanence of customs, in countries where the indolence of the inhabitants and a despotic government are continual obsta-

cles to improvement:—‘The Tigris is navigable for vessels of twenty tons burthen only sixty miles above Bagdad; but there is also a kind of float called a *kelek*, having been in very ancient use, which carries both passengers and merchandise from Mosoul to Bagdad. Its construction is singular—consisting of a raft in the form of a parallelogram. The trunks of two large trees, crossing each other, are the foundation of its platform, which is composed of branches of osier. To this light bottom are attached several sheepskins, filled with air, and so arranged that they can be replenished at will. The whole is wattled and bound together with wicker-work; and a raised parapet of the same secures the passengers. It is moved by two large oars, one on each side, and a third acts as the rudder. When these machines reach their place of destination, and the cargo is disposed of, all the materials are sold, except the skins, which, being previously exhausted of air, are laid on the backs of camels, and return to Mosoul with their masters. But the *kelek* is not the only vessel on these rivers which may be traced to antiquity. The *kufa*, so named from an Arabic word that means basket, is still used there as a ferry-boat. Its fabric is of close willow-work, and a good coat of bitumen completely secures it from sinking. Perfectly circular, it resembles a large bowl on the surface of the stream; it holds about three or four persons, though not very agreeably; and is paddled across with ease.’

‘Herodotus,’ my uncle added, ‘exactly describes these boats: he notices their circular form, the three oars, and their construction of willows and skins; and he mentions that, on their arrival in Babylon, the owners sold all the materials except the skins, which were returned to Armenia by land. And it is a very curious testimony to the truth of that historian, that, after the lapse of twenty-two centuries, we find the same customs and the same implements that he described still in use.’

‘But is it not more extraordinary, uncle,’ said I, ‘that the people of those countries have not adopted boats like ours, which would convey themselves and the rich merchandise of the east so much more securely?’

‘I do not think,’ replied he, ‘that it is very extraordinary, for we must consider, in the first place, that to build vessels like ours would be too hazardous an exertion for a people who are governed despotically, and who can never feel

secure of the possession of their property. And as to your "rich merchandise of the east," you will not find much of that in the neighbourhood of Bagdad at present. You read of such in the Arabian tales; but nothing remains now but the misery, the decay, and the desolation, which were so often foretold by the prophets.'

2nd.—I now perceive the meaning of the last part of Thomson's description of happy Harvest Home—

Thus they rejoice : nor think
That with to-morrow's sun their annual toil
Begins again the never-ceasing round.

For no sooner is that event over, than the labourer begins the preparation for a future harvest. The ploughs are all at work to-day; and I see the fields which have but just yielded up their 'rich burden' again prepared to receive the seeds of another crop. But this, my uncle says, is generally of a different species from the last, in order to make a change in the nature of the nourishment drawn from the soil. The ploughing in of the old stubble enriches the ground, or some other manure is added; and, indeed, I see it is, as he says, 'a continual chain of production and reproduction.' In some parts of the country, wheat is not sown till early in spring; but this depends on the nature of the soil. Oats are always sown in spring, but that grain is not commonly cultivated in this part of the country.

'The rich soil, then, of Gloucestershire, is better suited to the food of man, than to the food of horses?' said I to my uncle. 'Yes,' he replied, 'if you mean oats, by what you call the food of horses; but I assure you that, in a considerable part of Great Britain, the oat is the chief food of man—and, most happily for him, he can live on it. In the cold hills of the Highlands of Scotland, and in the poor soil of parts of England and Ireland, the oat thrives better than wheat; and not being put into the ground till the depth of winter is past, it is less liable to be injured by the effects of frost and damp. Barley, too, has this merit of growing in poor, or rather in light soils, and of supplying food for numbers.' I told my uncle that I was very desirous of learning something of agriculture. He advised me to observe the various operations of husbandry myself. 'When you are interested in the progress of the work,' he said, 'you will find it easy to comprehend the principles—far better than if

I were to give you a lecture every day on the subject. 'Now is the time to begin. The harvest, you see, is safely lodged, and that of the coming year is preparing. In the warmer regions of the earth, a very slight degree of cultivation is sufficient; and the natural sloth of man is encouraged by the small quantity of labour necessary to till the earth. Here, however, that is not the case: our climate is so uncertain, that constant labour is necessary to success; and in every season of the year some operations in husbandry are going on. The farmer must be at all times alert, either to prepare for something that is to be done, or to watch his growing crops, and help their progress by hoeing, weeding, earthing, and many other processes; but then he has, at all times, the enjoyment that labour brings with it, and the happiness which arises from industry. His best feelings, too, are excited, for he receives with a grateful heart the success with which Providence blesses his labours; or, if they fail—if the season is unfavourable, and blights his hopes, he learns to bear with humble submission, and sees that even the best human skill requires aid from Him who is Lord over the elements.'

3rd.—Another letter from Hertford rejoiced all our eyes yesterday. My aunt is so pleased with his journal, that she is sure you will like it too; and I have copied a large piece for you, dear Mamma.

'The Isle of Sky has very much interested me. Sky is the Scandinavian word for clouds. It is the Isle of Mist of the Gaëlic poet. The whole island is extremely hilly; and in the north-east part of it the mountains are very picturesque, the rocks and cliffs often assuming a variety of forms, like castles and towers. One remarkable rock, which is said to be 160 feet high, represents a spire so exactly, that it is so called by seamen, to whom it is a well-known sea-mark.

'The cliffs, on the eastern side of the promontory of Strathaird, contain a number of caves, one of which has been celebrated in history for having been amongst the places where Prince Charles concealed himself. We visited another, which is called the Spar Cave. The entrance is formed by a narrow fissure in the cliff, which, for the first hundred feet, is dark and wet; then comes a steep acclivity; but that once surmounted, the whole interior comes into view, covered with stalactites, disposed in a variety of gro-

tesque forms, and rising to the height of upwards of forty feet. In the floor there are numerous little pools, which are filled with groups of crystals, in a state of constant augmentation, and which afforded us a gratifying opportunity of seeing the process by which calcareous spar is formed.

'The coast scenery is, in many parts, very sublime. A series of columnar cliffs stretches to Loch Staffin, presenting the general features of the ranges of Staffa, but on a scale of five or six times the magnitude. In one place, these rocks represent a circular temple, of Greek architecture, so exactly, that the artist, in sketching it, might be accused of forcing nature into the forms of art. The detached state in which many slender groups remain, after the surrounding parts have fallen away, is a singular circumstance, that sometimes occurs among these columnar ranges. From their mode of wasting, the summits of the cliffs are frequently crowned with pinnacles; and, in some instances, single columns are seen, in front of the colonnade, appearing like the remains of a ruined portico. One of the most remarkable appears to be about 200 feet in height—its lower part clustered, and the pillars terminating in succession upwards, till a single one remains standing alone, for the height of thirty or forty feet, and apparently not more than four or five in diameter.

'There is a cascade here, which is very striking, from the unbroken manner in which it falls over a perpendicular cliff, not less than 300 feet in height; but when the squalls, which blow from the mountains in this stormy region, are violent, very little of the falling water reaches the waves below.

'We then visited Loch Scavig; and after passing the river which runs foaming over a rock into the sea, a long valley suddenly opens, inclosing the beautiful lake Cornish, on the black surface of which a few islands, covered with grass and juniper, form a striking contrast to the absence of all verdure around.

'It is an exquisitely savage scene, and was to me particularly interesting, because I had lately read again the "Lord of the Isles;" and here I beheld the truth of its descriptions, and felt anew the sadness and horror of the death of Allan. We often stopped, on our return, to admire the effects of the storms. Stones, or rather large masses of rock, of a composite kind, quite different from the strata

the lake, were scattered on the rocky beach. Some lay loose, and tottering upon the ledges of the natural rock, so that the slightest push moved them, though their weight might exceed many tons. The opposite side of the lake is pathless and inaccessible; and the eye rests on nothing but barren, naked crags, though of sublime grandeur. Indeed, our favourite Scott says truly—

For rarely human eye has known
 A scene so stern as that dread lake,
 With its dark ledge of barren stone.
 The wildest glen, but this, can show
 Some touch of Nature's genial glow.
 But here—above, around, below,
 On mountain or in glen,
 Nor tree, nor shrub, nor plant, nor flower,
 Nor aught of vegetative power,
 The weary eye may ken;
 For all is rock, at random thrown,
 Black waves, bare crags, and banks of stone,
 As if were here denied
 The summer's sun, the spring's sweet dew,
 That clothe, with many a varied hue,
 The bleakest mountain-side.*

WEEK 5.

Catechumens—Teaching Prayer to Children—Sociable Gross-beak—
 Early Rising—Agriculture compared to Gardening—Babylon—The
 Farmer's History—Customs of Stockholm unchanged.

Sept. 4th.—Sunday. My uncle read some parts to us this morning of a book which he likes very much—‘Sumner on the Ministerial Character of Christ.’ I intend soon to read it. There was a curious fact mentioned in the part my uncle chose, which, however, must be well authenticated, or Sumner would not have given it.

In speaking of the gradual manner by which converts were taught the truths and mysteries of the Gospel, he says that the *Catechumens* were not permitted to say the Lord's Prayer till after they had been baptized, and had therefore been thoroughly instructed in the Gospel. The Christian converts, he says, were divided into the *Catechumens*, or learners, and the *Fideles*, or believers; and there was a great distinction maintained between these classes, in the

* Lord of the Isles, c. iii.

primitive church. The Catechumens were allowed to hear the Scriptures, as well as the popular discourses upon them, and upon points of morality; but it was not till after baptism, when those converts became Fideles, that they were allowed to partake of the Lord's Supper. Another privilege was to join with the ministers in all the prayers of the church. More particularly, the use of the Lord's Prayer was only permitted to the Fideles: it was considered an honour, to be conferred only on the most perfect Christians, to be allowed to use it; and it was therefore called by some of the Fathers 'the prayer of the believers.'

After my uncle had finished reading what I have only written here from memory, we had some conversation on the subject of early religious instruction: for a lady was present who disapproved extremely of not teaching the Lord's Prayer to little children as soon as they could speak. 'It is so pretty,' said she, 'to hear them lisp out prayer and praise.'

'Yes,' said my aunt, 'if they understand what they lisp; but if they do not, I consider it as a sort of profanation.'

'And would you not teach children to pray while they are young?'

'I do teach them to pray,' replied my aunt, 'but only in the most simple manner, so that their little minds may accompany their words, and that they may not acquire an early habit of inattention, from repeating phrases which they do not comprehend.'

'You know, my dear madam,' said my uncle, 'that in education nothing should be done without object. Let us consider the object of teaching a young child to pray: is it not to give it an early feeling of devotion, and to implant the seed of what we hope will grow and ripen with the child's increasing strength?'

'Oh! surely, that, you know, is what I mean,' said the lady.

'Therefore,' said my uncle, 'I would endeavour to lead the little heart to rational prayer and to real piety, by teaching it only what suits its comprehension, and never suffer it to repeat, by rote, what it cannot distinctly follow.'

'Then I suppose,' said she, 'that you would not teach children to church?'

'Certainly not, while their minds are still in the infant state.'

'We have never taken any of our children to church.'

said my aunt, 'till they had obtained a certain portion of religious knowledge. The consequence has been what we expected; for I must say, that our children are not only remarkably attentive to the service of the church, but do, I believe, really join in it with their hearts.'

The lady appeared to be satisfied; and my uncle, turning to me, said, 'Bertha, my dear, pray tell your mother what we have just been saying. Many years ago she convinced me of the justice of these ideas; your aunt and I have adopted them from her; and you will judge for yourself as to our success.'

I have written this conversation as well as I can remember it; and I may add, dear Mamma, that nothing can be more just than what is said of my cousins, for they are truly religious, but without any show or ostentation. Some day I will send you the nice simple prayers which have been composed for little Grace.

5th.—Besides the two species of the little bird that builds pendulous nests, which I have already mentioned in my journal, my aunt has just told me of another, the Sociable Gross-beak. It is about the size of a bulfinch, brown and yellow, and is found in the interior country at the Cape of Good Hope. Its habits were thus described to my aunt:—These birds live together in large societies, and build in a species of acacia, which grows to an uncommon size: they seem to select it on account of its strong branches, which are able to support their extensive buildings, and also for its tall smooth trunk, which their great enemies, the monkey tribes, are unable to climb. In the tree described to my aunt, there could not have been fewer than eight hundred birds residing under a single roof, which appears like thatch, and projects over the nests, and is so smooth and steep that no reptiles can approach them. The industry of these birds is equal to that of the bee: throughout the day they appear to be busily employed in carrying a fine species of grass, which is the principal material they employ in the construction of this extraordinary work, as well as for repairs and additions.

It appears that, as they increase annually in numbers, they join nest to nest, till at last the bough on which they have built gives way under their weight, and they are forced to seek for a new dwelling. One of these deserted colonies was examined, and found to be as ingeniously contrived

within as without. The entrances formed a regular street, with nests on both sides, at about two inches distance from each other; and it was evident, from the appearance, that a part of it had been inhabited for many years. The grass with which they build is called Boshman's grass, and its seed is their principal food; but the remains of insects, found in their nests, prove that they prey on them also.

6th.—I wonder, dear Mamma, whether it is as difficult to others, as it is to me, to lay aside old habits. I must acknowledge, that I have been of late too much addicted to lying in bed, and have quite disgraced myself, after having for some time made great efforts. It is a strange sort of indolence that chains me down, and makes me delay, from moment to moment, the trifling exertion of jumping up;—it is not sleep, for I am generally awake, merely thinking, in a confused sort of way, of things that are past, or things that I intend to do. My aunt says, that were I asleep all the morning, she would not then struggle against my habits, for my constitution might require sleep; but I have not that excuse to plead.

When I do get up early, there is no time of the day that I enjoy so much. The brightness of the morning sun makes the dewy trees and grass look so beautiful; and then the birds seem so happy, and so active, in the sweet fresh air. These are pleasures that I knew not till I came to England, and they are every day within my reach: I have determined not to let them slip any more. You have often told me of the danger of giving way to bad habits, but nothing teaches one so forcibly as experience.

My aunt and uncle are both of them early risers; and they consider it of great importance that young people should so manage their time as to have some part of every morning to employ in serious reading. 'I wish my little Bertha,' said he, 'to bestow ample time on the neatness and propriety of her dress; but it is still more necessary that she should never feel in the least hurried in the performance of those religious exercises with which every day should begin, and which should be gone through with calmness and leisure before she joins the family circle at breakfast, and before the cares or pleasures of the day mix with her grave thoughts.'

They spoke to me very kindly on this subject yesterday and I think and hope that I shall not again show my

unmindful of their advice. I have consulted Caroline about it; I find that she and Mary are always up early, and are seriously engaged for a part of the morning.

Caroline is, indeed, an extremely early riser, and she has engaged to rouse me regularly at a reasonable hour. She began this morning; and, to encourage me, she read a pretty little poem on early rising. By copying it for Marianne, I shall recollect it the better:—

Good morn, good morn—see the sweet light breaking
O'er hill and dale, to greet thy waking!
The dark grey clouds are flitting away,
And the young sun sheds forth a twilight ray;
And an halo of bloom is in the skies,
Yet the night of slumber is on thine eyes.
The dew lies fresh on the opening flower,
And sweetly cool is the youthful hour;
And the birds are twittering their tender song
The bright and weeping boughs among;
And all seems fresh and with rapture rife,
While wakening into conscious life.
Oh, rouse thee! rouse thee! the precious time
Is fleeting fast—and merrily chime
The morning bells; and the beautiful view
Thy touch should arrest is fading too!
The glow of the cloud is darkening fast,
And the sunny mist is almost past;
And thy lyre is lying all unstrung;
And thy matin hymn is still unsung;
And thy lip is mute, and thy knee unbending,
Nor is yet the sweet prayer to heaven ascending.
—What! slumbering still! Arise! arise!
For thy lively dreams are fantasies,
And mock thy waking; but come with me,
And listen to life's reality.
And come and muse on that deeper sleep
O'er which Hope will her silent vigils keep,
And soothe and shield with her guardian wing
The Spirit's secret fluttering;
And lead it on to that brighter day
Which knows no evening and no decay.

7th.—My uncle says, that agriculture is only gardening on an enlarged scale; and that all the implements are only magnified garden-tools. The sharp edge of the sloping ploughshare turns up the earth in the same manner as the spade, which is put into the ground in a slanting direction; but the plough being drawn by animals whose strength is far superior to that of man, in a few hours the earth is

separated and thrown back, in a space that, to be dug, must have occupied days.

The harrow is only a large rake, and is useful, not only in breaking the clods of earth, but in covering over the newly-sown seeds. What useful inventions were these machines, and all the improvements that have been made in them!

My uncle explained to me that vegetation is the common source from whence all animals derive their food: either at once from the growing plant, or at second-hand from their prey, who had been nourished by it; and that vegetables, in their turn, live on all that has already lived and vegetated. There is a continual succession of production and decay; for it is by decay and the decomposition that follows, that nature restores to the ground those substances of which it is robbed by vegetation.

But when the produce of the soil is removed for the use of man, and not left to immediate decay, the agriculturist is obliged to assist nature, by supplying other decayed vegetable matter, or else by mixing it with some artificial manure. To do this more effectually, people are obliged to study the principles of the different soils, in order to know what species of manure should be applied to fertilize or to correct them: to render one, for instance, more alkaline, or to lessen the siliceous nature of another. Even rest restores to the earth some of its productive powers; and when it is ploughed up, and long exposed in what is called a *fallow*, the air has considerable influence in improving it.

This led to a conversation on the many varieties of soils; and my uncle says I shall become acquainted with them in time. They are all well-known to good farmers, who can thereby determine what crops are adapted to each. Who could have thought, Mamma, that all this skill and knowledge was necessary to a common farmer! I imagined that any one could sow what seed he chose, and then reap and gather the produce; but as to feeding the earth in return, for the nourishment drawn from it, I cannot say that entered my head. So you see that I have learned something to-day—something real, Mamma.

8th.—My uncle has been very much interested in an account which Ker Porter gives of Babylon, in his second volume, and has been so kind as to read to us the description of what this great city was when at the summit of

glory; and what it is now, and has been for so many ages. According to Herodotus, the walls of this prodigious city were sixty miles in length, and formed a square of fifteen miles each way, in which gardens, lawns, and groves were included. They were built of large bricks, cemented together with bitumen; and, he says, were 350 feet high, and 87 feet thick, and protected on the outside by a vast ditch, lined with the same materials. There were 25 gates of solid brass on each side, and from every gate a street of 150 feet wide crossed the city to the opposite gate. According to his description, the temples, palaces, and hanging gardens were equally wonderful. A branch of the Euphrates flowed through the city from north to south. To prevent this great river from overflowing, it was confined by walls or quays of brick; and while these were building, the course of the river was turned into a basin, forty miles square and thirty-five feet deep, which had been cut for the purpose of receiving it.

The wealth, and power, and grandeur of this magnificent city are strongly expressed in the Scriptures, where it is spoken of as 'the lady of kingdoms, given to pleasure, that dwelleth carelessly, and sayeth in her heart, I am, and there is none beside me.'

Among its vast buildings was the tower of Babel, erected ages before by Nimrod, on the plain of Shinaar—a pyramid, or rather a mountain of masonry in that form, and on which it is supposed that, in after ages, Nebuchadnezzar raised the temple of Belus. This temple was of such prodigious magnitude, that, having been destroyed by Xerxes, it cost Alexander, who intended to rebuild it, the labour of 1600 men for two months, in merely removing the rubbish caused by its destruction.

Of all these immense buildings, the traces can now be scarcely distinguished; confused heaps of bricks extending many miles, and grown over with grass, still exercise the ingenuity of travellers and antiquaries. In this dreary waste, there are, however, three very conspicuous mounds. The principal one, now called the Birs Nimrod, is supposed to be the temple of Belus. Ker Porter says that, in passing this barren tract, his eyes ranged on all sides for something to point out the remains of this once imperial city; but all was withered and gone, and comparatively level with the horizon, except where the gigantic Birs Nimrod presented

itself, 'standing in the solitary waste like the awful figure of Prophecy, pointing to the fulfilment of her word.'

The two other mounds of ruins are supposed to be the citadel and the palace. The former is of an oblong shape, and flat at the summit; and several excavations which have been made in it by the Turks, when searching for hidden treasures, are now occupied by wild beasts. In his second visit, his party suddenly halted, on seeing several objects moving about the summit, which they at first imagined to be Arabs, but which were soon discovered to be lions.

What numerous reflections this sight must have produced! Those savage animals, thus wandering amidst the towers of Babylon, and dwelling within the cavities of her once magnificent palaces, proved how faithfully the prophecies had been fulfilled which relate to her fall, and how exactly the words of Isaiah have been verified:—'Wild beasts of the desert shall lie down there, and the houses shall be full of doleful creatures.'

Among the fragments, and elevated on a sort of ridge, he found the famous solitary tree which has escaped the general destruction. It bears the marks of almost as great antiquity in its appearance as tradition gives it. The Arabs call it *athelè*, but its species was quite unknown to him; the trunk must have been enormous, and now, though hollow and shattered, it supports very large spreading branches, which are adorned with tress-like tendrils resembling heron feathers. These long and delicate tendrils bend towards the ground, like a weeping willow, and, while gently waving in the wind, they make a low melancholy sound.

The Euphrates wanders in solitude through this desolate region; its banks are covered with reeds, and now, unrestrained by its former stately quays, it annually overflows the country: producing high rank grass, and leaving stagnant pools and swamps among the hollows of the adjacent plain.—'I will make thee a possession for the bittern, and pools of water.'

Upon the whole, though so little remains to point out the several parts of this once stupendous city, there is enough to convince the attentive examiner, that he is on the very spot where the hand of God wrote on the wall the awful and well-known denunciation against Babylon!

How the scene is now changed! At that time these broken hills were palaces; these long undulating moun-

were streets; and this desolate solitude was filled with the busy subjects of the proud daughter of the East.'

My dear Mamma, I hope you will not think that I fill up my journal with too long extracts; but I was so much interested in all that relates to Babylon, that I could not deny myself the pleasure of copying some parts of this great book, which I am sure will not for a long time make its way to Rio.

9th.—Do you recollect, dear Mamma, that I mentioned in my journal, about a fortnight ago, my uncle's surprise at meeting an old acquaintance at the harvest-home, who, when he formerly knew him, was in the gay world, and who it then seemed very improbable would have to lead a rural life, and to associate with plain farmers? My uncle's notice was attracted by his very gentlemanlike air, even in the homely dress of a farmer; and when he discovered who he was, he doubted at first whether he should address him, as he feared that the evident change in his situation might make it disagreeable to him to be recognised. However, they did renew their acquaintance, and my uncle obtained permission to wait on him.

He rode to see him in a few days, and was much charmed with the neatness of his farm and cottage, and, indeed, with all his family. He lives on the borders of the forest, as well as my uncle, but at a distance of several miles from this place. My uncle gave us a little sketch of his history in the evening, as nearly in his own words as he could; and he was so kind as to permit me to tell it to you, because he thinks you once knew this gentleman yourself. I have never heard his name, so I do not know what to call him; and I will try to write it just as my uncle repeated it to us:—

'At the period that you knew me,' said he, 'I was moving in the most fashionable circles, occupied by the world and all its silly amusements, and without any other object than to pass away my idle life. I travelled on the continent; I afterwards went into the army; but, at home or abroad, I was pursued by that *ennui* which is always the consequence of idleness. I need not recount to you, Sir, all the extravagant follies I committed in search of pleasure—that brilliant, but deceitful phantasm, which leads us into error and betrays us to disappointment.

'From the time that I was a schoolboy, pleasure had been my only object; the mistaken indulgence of my parents in-

creased the fault and diminished the enjoyment; for it left me no difficulties to overcome—no efforts to make. My father was rich, and profusely generous to me; and though I was the second son, I knew that my mother intended to bequeath me her estate, which was in her own power.

‘At last I grew tired of idle prosperity; I sighed for novelty, to relieve me from the burden of time; and I sometimes felt that I had a mind capable of more than had hitherto occupied it. Having gone with some of my friends to shoot on my mother’s property of Strath-morton, I was attacked by a feverish and tedious cold; and as my gay associates left me when I could no longer join in their pursuits, I had abundant leisure for reflection. The good-natured old steward was my principal visitor, and his conversation generally turned on the miseries of not having a resident master at Strath-morton; for my father and mother always resided at their place in Sussex, and a poor tenantry and impoverished land were of course the effect of this absence. This led me to think of my insignificant life. I began to wish for the variety of being useful; and at last I determined to become an active country gentleman, in order to become of consequence, as well as for the pleasure of having a new object. The motives were undoubtedly erroneous; but I tell them, Sir, in order to show the progress of my mind.

‘I readily obtained my father’s permission to make Strath-morton my abode; and, with his sanction, I entered on my new life as soon as it was possible to make my arrangements. The novelty alone could at first have made me endure it; but I found a sort of pleasure that seemed extraordinary at the time; and in the course of a few months I had, with the natural energy of my character, quite devoted myself to my new occupations. My mother was gratified to see me interested in the place that was to become mine; and full powers were given me to thin the ancient woods, to make whatever changes I pleased, and to lay out money to a considerable amount in improving the estate, which had been much neglected. By degrees, the increase of knowledge and the encouragement of a little success, made these employments less irksome; and I began to feel a real interest for the tenants and labourers. I found that I could easily promote their comfort; I felt that I was of consequence, and I began to enjoy all the pleasures of assisting the industrious

‘I had been attached to a young lady, whom I had known in London only. I knew that, though fashionable, she was well principled, clever, and literary; and I imagined that I was equally well acquainted with all her tastes. We married. I expected her to be perfect; and when I brought her, early in the summer, to Strath-morton, I anticipated the delight of having a companion to sympathize with, and to assist me in the plans to which I had devoted myself. Judge, then, of my disappointment at finding that she had no taste for a real country life, and disliked its monotonous occupations. For some time, however, we lived happily, till I lost my kind, indulgent father, who was succeeded in his honours and estates by my brother; and as I perceived that my expensive improvements could not well be continued, now that I had no longer my father’s wealth to support them, I took that opportunity to indulge my wife in a visit to the continent.

‘On our return to England, my mother was apparently in health, but in a few weeks she was suddenly seized with a severe illness, and died before she could collect her thoughts sufficiently to arrange her affairs. Forgetful of the uncertainty of life, she had made no will; and her estate, which I had long considered as my own, was inherited by my brother as heir-at-law.

‘What was now to become of us? My father, anxious to preserve the wealth of the head of the family, and knowing that Strath-morton was to be mine, had left me but a very small property; and as my brother was not sufficiently convinced of what had been my mother’s intentions, he retained her estate. My wife’s fortune had been small. In short, we were suddenly reduced from the thoughtlessness of affluence to absolute poverty. I might, perhaps, have obtained some employment, which would have just enabled us to live; but I was not much inclined to take up my abode in London, in so different a style from that in which I had always appeared there. Vanity and pride survive all the other passions—and my country life had rather increased than subdued them. However, though painful to me to return to London, I determined to do so, if my wife approved, and I left all to her decision. I knew she did not love the country, and I anticipated that her sentence would be some hard-working office for the rest of my life.

‘But I little knew the soundness of my wife’s judgment, and her generous forgetfulness of self. Her decision was

soon made. "In our circumstances," she said, "and for our children's sake, a laborious country life will be vastly preferable to the confined, and not less laborious, situation of a clerk, or some such thing in town; we can more easily submit to deprivations, and shall be better able to support and assist each other's toils." I reminded her that she disliked the country. "Oh," said she, "think no more of those fancies; it is on ourselves alone, and not on the gratifications of either town or country, that our happiness must now depend. Let us take a small farm—let us be really farmers. You will be able to apply the agricultural knowledge you have acquired; and I will not neglect my part. Our children must be bred up usefully: they will not be accomplished; but what does that signify?—they will be our real comforts, and we can teach them real virtues.

We'll form their minds, with studious care,
To all that's manly, good, and fair."

'I gladly consented, and was so fortunate as to procure this farm at a reasonable rent, and with a comfortable cottage. My creditors saw that my intentions towards them were honourable; and satisfied with the assignment of my little patrimony, they insisted on my retaining my books, and such furniture as could be useful. We soon removed, and firmly resolved to submit to any distress, however abject, rather than get into debt. I may now acknowledge that our distress was sometimes severe, while learning the little details of economy. The art of good management, if not acquired in youth, can only be gained by bitter experience. You will perceive, then, that I became a real hard-working, drudging farmer; and you will wonder, probably, how we could get on, when I had such an ignorant wife. My dear sir, I cannot do her sufficient justice—I cannot describe the strength of mind with which she cheerfully submitted to the change of life, nor the energy with which she sought the common knowledge requisite for our situation. She had proposed this life of labour, and she almost seemed to enjoy it, and to find pleasure in her continual exertions. For some years we could only have one servant, a poor, hard-working, willful creature, who, though doing her best, could not do half that was necessary for our family. But this best of wives instead of unreasonably expecting everything from or

poor slave, as I might almost call her, worked hard herself. She who had been used to late hours and luxurious ease was up at six every morning, to superintend her little household, and to make with her own hands most of the preparations for our meals. She was the same in everything, and never uttered a complaint.

‘Oh! how often in these years of distress, when every shilling we could spare was devoted to discharging old debts, did I think of the sums I had lavished in my days of gaiety—on useless trifles—those trifles that are well-named “*’tis buts*”—on dress—on all those indulgences of appetite which leave no pleasure behind; and the taste for which I can distinctly trace back to the habits of petty self-indulgence permitted at our great schools.

‘The first winter of our residence here was one of such hardship, that I trembled for my wife’s health; but Providence graciously supported her. It was at that time that a circumstance occurred which I think will interest you. We had an infant, a few months old, who suffered much by the anxiety that my wife, who was nursing it, secretly felt: the poor babe sunk: its decline was rapid; and before we were aware of the danger, we found that it was actually dying. It was on a dreadful evening of snow and storm, that we sat watching over our expiring babe. One candle lighted our little room, and, cold as the weather was, we could only afford a small fire; my three elder children were gathered close round it: and one began so mildly, but urgently, to ask for her supper, that a piece of bread was given to her. We heard a violent knocking at the door, and the maid having opened it before I could go myself, two men rudely pushed by her, and forced their way into the room where we sat. You may imagine the indignation and horror I felt at such an intrusion, and at such a moment. I asked, as calmly as I could, their business, and one of them said—“Our business is, sir, to demand assistance;—you may call it charity, if you like, but as we are driven by want of work to starve, we must take by force what is not willingly given to us. My children have not a crust to eat, and I am resolved to procure something for them; this is the first time we have ever attempted to get by force what we would willingly earn by our labour.”

“My friends,” said I, “I am a stranger here, and in

distress myself—misfortunes have reduced me as well as you; and the whole sum that I am at present possessed of will scarcely do more than pay for the funeral of the infant whom you see dying. I will give you a part of it;—if you take it all by force, I cannot resist you. All I can do is to advise you not to enter on this lawless life. Why do you not apply to the clergyman of the parish? Try every honest means before you attempt to live by violence; but if once you stain your character, nothing can restore it. Return to your homes:—I promise never to betray you, unless you renew such conduct. Take this money; and perhaps tomorrow may bring you employment or assistance.”—“And here,” said my little girl, “here, take this bread to your little children—it was my supper, but I can do without it.”

“The man was touched by this action of the child;—his voice faltered as he thanked me for the small sum I had put into his hand, and with his companion went away quietly. They followed my advice, and applied next day to the village pastor, who had but lately returned from an absence occasioned by ill-health, and who as yet had known nothing about me. He soon found his way to our cottage, sympathized with equal delicacy and kindness in our affliction, and requested as a favour the permission of sometimes visiting us. The friendship of Mr. Benson, who is an example of the virtues and graces of piety and benevolence blended together, has been our greatest source of pleasure ever since the sad occasion of his visit; and I may say that I owed it to the gratitude of the poor mistaken men whom I had rescued from guilt. I found that they were Irishmen, and that they had been driven as vagrants from parish to parish. I soon had it in my power to procure them work; and their warm hearts do, I believe, feel endless gratitude.

As my eldest boy was a very promising child in disposition and intellect, my good friend, Mr. Benson, made it a point that he should be allowed to assist in his education; he has completely prepared him for the university, and through some interest which he possesses he was so kind as to place him there a few months since, at a very trifling expense to me.

“Through him also another happy circumstance occurred to me two or three years ago:—a connexion of Mr. Benson’s who had lately come into possession of an estate in the neighbourhood having met me at the parsonage requested

me to be his agent, giving me full powers to plant, improve, and superintend the management of the whole property. This to me is a most interesting employment ; and as I give full time and attention to it, I consider my salary to be fairly and honourably earned.

‘Amidst all her laborious vocations, my wife continued to educate our daughters. Her main object has been to give them religious principles, and that solid kind of knowledge which a well-taught female should possess. She has made them, as I hope you will find, gentlewomen in their manners, but industrious and independent ; and she has, I think, inspired them with her own neatness and love of order, which never ceased, even when our distress might have been some excuse for negligence. We had, as I mentioned, preserved our books ; and with these, and the aid of her own admirable talents, she has formed their minds, and, I may say, their hearts ; for she has taught them to love being useful, and never to turn from a poor applicant under the selfish plea of their own poverty, or the specious one of public duty.

‘We have gradually made our cottage larger : clean, neat, and cheerful it always was, but now it is really comfortable. Here I wish always to remain : it has been the scene of happiness, springing from active exertion, and humble religious trust.’

10th.—My uncle had a visit to-day from a Mr. H——, who is just returned from Stockholm, where he has been for some months. He told us a great deal of the manners and customs of that city ; and it is curious to observe how exactly its present state agrees with the account given by Dr. Clarke, who says, ‘that if a razor was to be put in order, or an instrument repaired, it was sent to London ; and that such was the scarcity of vegetables, that there was a constant importation of them from other countries. When he was at Stockholm, there were thirty-six wig-makers, and only one cutler ; forty-seven vintners, and not a single chimney-sweeper ; nineteen coffee-roasters, though coffee had been prohibited ; one hundred and thirteen keepers of ordinaries, and only one tool-grinder. Iron and tar were to be had in plenty ; but there was nothing good manufactured in the country, excepting Scania gloves, which are the best in the world. Almost everything imported from England was contraband, and, therefore, clandestinely sold,

at an immense price. The inferiority of Swedish workmanship, and often the total want of the article itself, is very striking—a whole day may be lost in searching for common necessities.

When Clarke was at Christiana, in Norway, a rich merchant told him, that all the linen of his family was annually sent to London to be washed. 'We cannot go,' said he, 'to market, or to shops, as you do in an English town: here those who would live handsomely must collect into their own warehouses, from all parts of the world, whatsoever they may want for a whole year's consumption.' Mr. H. says, 'there are few hands in Sweden expert enough to repair machinery; and the clumsy machines used in the mines are a proof of the small progress they have made. As to gardens, scarcely any body thinks of cultivating vegetables enough for themselves, much less of having them for sale; and England still largely supplies that article of food to Stockholm.'

In speaking of this, after Mr. H. had gone, my aunt reminded us of the facts we had lately read in Ker Porter's *Persia*, respecting the manner in which some customs continue unchanged for ages; but she thought this far more extraordinary in Sweden, which is in constant communication with the rest of Europe.

'It is partly caused,' said my uncle, 'by the nature of the government, which tends rather to repress, than to excite speculation. Some improvement, however, does take place: a friend of mine, Mr. B., thirty years ago, saw in a gentleman's garden at Stockholm a little bed of potatoes, which the owner showed him as a great curiosity. "They tell me, sir," said the gentleman, "that in some countries the roots of this plant are eaten as common food by the people." Yet now,' continued my uncle, 'this potato, which was then such a wonder, is generally cultivated throughout all Sweden, and is liked by all classes.'

WEEK 6.

Various meanings of "Thy Kingdom Come"—Druidical Monuments—Neatness—Fall of Mont Grenier—Return of Franklin—Bert wishes to have a Garden.

Sept. 11th.—Sunday. Wentworth asked my uncle to do what is meant by—*Thy kingdom come*—in the Lord's

prayer? 'What do we exactly pray for when we repeat those words?'

'I believe,' said my uncle, 'that they have been variously explained. By some they are supposed to allude to that period when the Messiah will again dwell on the earth, and when wickedness and misery shall finally cease. Others apply them to the universal diffusion of the gospel; when all nations will become the people of Christ, and when his kingdom may therefore be truly said to extend over the whole world.'

'But, besides these general, and, I fear, distant applications of the expression, there is another, and a simpler one, which more immediately directs itself to our present feelings and actions: when the influence of Christ has overcome all our sordid and selfish motives; when his humility is the example we endeavour to follow; when our passions are controlled by the purity of his precepts; when our actions are subjected to the dominion of his will; in short, when our love, gratitude, and obedience to him form the governing principle of our lives; then, indeed, it may be literally said, that his reign has been established in our hearts, and that his kingdom has come.'

'We may certainly interpret these words as relating either to the future kingdom of the Messiah on earth, or to the progress of Christian knowledge in humanising the savage and enlightening the heathen; but we are scarcely authorised to suppose that our prayers can be of any avail in hastening the time appointed by immutable Wisdom for those important events. When, therefore, in using this sublime and concise prayer, we mean to express either of these significations, we must perceive that they do not possess that second quality which seems to me to be essentially necessary in every prayer proceeding from man—namely, that while we address our petitions to God, they, at the same time, should convey an admonition to ourselves, and instruct us how to do our part towards attaining those objects for which we supplicate.'

'But if, on the other hand, we apply those words to the dominion of Christian principles in ourselves, we are given reason to hope that the petition may be granted, because we pledge our own humble but earnest efforts, as the requisite condition on which we presume to pray for it; and, for these reasons, I am inclined to consider that this is the most important meaning of the words, "Thy kingdom come."'

12th.—Hertford's letters have of late been very frequent. I thing the following extract will amuse you.

'The Druidical monuments of the island of Lewis are remarkable. Scotland possesses many specimens of those structures; but, except in Lewis, they are rare among the Western islands. In the neighbourhood of Loch Bernera several of them are comprised in a comparatively small space: a square mile would include the whole. They are situated in an open, fertile tract, on the borders of an inlet of the sea; and if they were really temples, dedicated to Druidical worship, so many being collected together would almost imply that this spot was the seat of a college. Next to Stonehenge, they are, perhaps, the most interesting remains which have been found in Great Britain.

'The largest of these structures has the form of a cross, with a circle at the intersection, and a large central stone. Its total length, at present, is 588 feet, but other stones are found, in the same direction, for above 90 feet farther; so that we may suppose the whole length to have been nearly 700 feet. The cross line, which intersects that one at right angles, measures 204 feet, but it probably was much greater; and the diameter of the circle that occupies the interior of the cross is 63 feet. The stone which marks the centre is 12 feet in height; the other stones rarely reach beyond 4 feet, though a few of 7 or 8 feet high are to be found, and one reaching to 13 is seen near the extremity of the long line. The intervals between them vary from 2 to 10 feet; and the whole number of stones, either erect or recently fallen, is forty-seven. The aspect of the whole work is very striking, as it occupies the top of a gentle eminence of moorland, and as there is no other object, not even a rock or a stone, to divert the attention, or diminish the impression which it makes.

'There are some circles of stones to be seen in the neighbourhood, but they are less perfect; and several large solitary stones, apparently of a monumental nature, are found in other parts of Lewis; but the *cruciform* shape of the structure which I have described is a remarkable and peculiar circumstance. No ruin, of that form, has been traced before the introduction of Christianity; and I believe it is agreed that where the figure of the Cross is found carved on buildings of higher antiquity, it has been done by Christians, who have converted the monuments of ancient superstition to their own purposes. But such attempts cannot

be supposed to apply to such an assemblage of large rude stones ; while the circular parts, and the general resemblance of the whole to other Druidical structures, seem to prove its ancient origin.'

13th.—My uncle is so kind as to permit me to sit in the library whenever I like ; and though he studies a great deal, he says my being there does not disturb him. He seems pleased whenever we young people go there, and very often lays aside what he is engaged in, to converse with us, or show us something curious. Sometimes he takes that opportunity of giving a little gentle reproof ; for he is so considerate of our small feelings, that he seldom exposes any one publicly in the family circle, knowing that half the good is destroyed by the mortification.

I was up remarkably early this morning, and went to the library before breakfast, expecting to be commended a little for my improvement in early rising. After our morning greetings, my uncle did commend me very kindly, and said that the pleasure of seeing me in the library was doubled by the satisfaction it gave him to find that I had such power over myself. I was beginning to exult a little inwardly at this, when he added—' But now, Bertha, as there are few pleasures without alloy, I must cloud this praise a little by doing what I dislike—by finding fault.'

You may suppose, dear Mamma, what a damp this cast on me for a moment ; but I knew that he never chides without reason, he is so mild ; and he never mistakes one's conduct, he is so just ; so I brightened up again, and anxiously listened.

' The fault, my dear Bertha, which I have to mention, is one that I have observed ever since you have been here—and it is, in my opinion, so important, that I can no longer wait for your own good sense to perceive it ; for habit strengthens at a rapid pace. A general want of neatness is the fault to which I allude. I do not mean a want of actual cleanliness, but an untidy, careless way of arranging your clothes,—I observe that they are not always put on straight—up at one side, down at the other—your petticoat, or something, forcing its way above or below the edge of your gown—a button off—a string broken—part of a flounce torn or unsewed—frills looking flattened and wrinkled, and not having the fresh appearance that everything about a young lady should have. Your hair is, in general,

shining and nice, but I do not perceive why it should not always be arranged more carefully, and so as to prevent it from straggling at the sides, as I sometimes see.

'Ladies are always very anxious to be fashionable; but I assure you, Bertha, though your dresses may be of the newest patterns, you will not look well dressed without something more. Fashion changes continually; the furbelows of to-day give place to-morrow to some other whim—and the vulgar and the empty-minded have the never-ending delight of altering their dresses, but fail, after all, in acquiring the air of gentlewomen.

'A good carriage, a smooth walk, a feeling of being at ease in company, ready attention to all that is going on, and withdrawing one's thoughts from self, give the stamp of good society more effectually, than all the finery that can be purchased. That valuable feeling of being at ease, and the self-possession it produces, can be obtained but one way. Never allow yourself, when alone, to sit or move in a manner that you would think inconsistent with propriety in company. But to return to our dress,—pray, accustom yourself to have your clothes in neat order, whatever they are; and well put on, *at all times*. The French expression "*d'être bien mise*," conveys everything that can be said on this subject; for besides the reasonable attention to fashion, which good sense requires, and the suitable correspondence of colours which implies good taste, it includes all the proper pinning, tying, and arrangement, which in my opinion is the most important point of all.'

I thanked my uncle very sincerely; and he then added, 'Yes, Bertha, I consider it as a very unwise tenderness, not to make known their lesser faults to young people. Your aunt is of a somewhat different opinion, and was unwilling to annoy you, so I took it on myself to advise you on the subject of your toilette. It was from this mistaken delicacy of your dear aunt's, that one of your cousins was acquiring the unfortunate habits of want of neatness and an ungraceful walk. Your aunt depended on her own good sense to overcome them; but at last, perceiving the injury we should do the child, by allowing those habits to become fixed, spoke to her myself—she not only outlived my interference but immediately and vigorously set about correcting them. She found some difficulty, I believe, but she has succeeded so well, that I think you cannot discover which of n

daughters I mean, except that she is now, perhaps, the most remarkable for her neatness, and is always *bien mise*.'

14th.—My uncle read to us to-day an account of the fall of a part of Mont Grenier—a very astonishing instance, he says, of the local changes that occur on the face of the earth. I must give you a short account of it, dear Mamma.

Mont Grenier is five miles south of Chambéry, and rises about four thousand feet above the broad plain, on which it stands almost alone. A part of this mountain fell down in the year 1248, and entirely buried five parishes, and the town and church of St. André. The ruins spread over nine square miles, which are called 'les Abîmes de Myans'; and though many centuries have passed away, they still present a singular scene of desolation.

The Abîmes de Myans now appear like little hills of a conical shape, and varying in height from twenty to thirty feet. They consist of detached heaps of fragments, but the largest masses have evidently fallen from the upper bed of limestone, by which Mont Grenier is capped; and some of them have been projected to the distance of four miles from the mountain. This limestone rests on beds of softer materials, by the gradual crumbling away of which, it is supposed, the mass above them was undermined and precipitated into the valley. In the course of years, the rains or torrents, produced by dissolving snows, have washed away the loose earth, and thus the little conical mounts have been separated and detached as they are seen at present.

So deep is the mass that has covered the town of St. André, that nothing belonging to it has been discovered, except a small bronze statue. The ancient chronicles do not inform us whether the catastrophe was preceded by any warning that allowed the inhabitants time to escape. The quantity of matter sufficient to cover the plain to such a depth and extent, rushing from the height of three-quarters of a mile into the plain, must have produced a shock inconceivably awful. A great part of the district has been gradually planted with vines, but it still presents a most impressive scene of ruin.

My uncle said that this is one of the most remarkable *éboulements* of which he has ever seen a description—he read it to us from travels very lately made in Switzerland and Savoy*

* Bakewell's Travels.

15th.—I hope you are interested, dear Mamma, in Bessy Grimley's history.

Franklin is returned—he came about a week after his letter; poor Bessy was very anxious, for the weather was stormy, and she could not hinder herself from being frightened at the thoughts of the great ocean he had to cross. We went again to see her, and I tried to cheer her, by telling her I had lately come a much longer voyage. My aunt accompanied us, and was pleased with the cottage and its inhabitants: she went to visit the poor old decrepit woman, and found her bed made up comfortably, and both that and the room looking very tidy and clean. The window was open and a rose-tree covered with flowers hung over it. 'My poor daughter,' said the old woman, 'planted that rose-tree in her last illness, and Bessy has nursed both it and me; and she trims it and trains it in such a manner, that the flowery branches hang where I can see them, because she knows how much I love the tree.'

My aunt observed a little shelf of books in one corner, and asked if Bessy could read, 'Oh! yes, Ma'am—I wonder the old man did not tell you that, for many a time she has comforted us both, and indeed often makes me feel less pain, by reading to us. I taught her myself, when she was a little creature, and I am sure I often wonder how any one can object to the poor having the blessing of education. Why, it would do your heart good, Ma'am, to hear her read the Bible, she reads it with such piety—or a prayer or two often out of her prayer-book. We have a few little stories too, that we like to hear again and again. The Blind Farmer—and the History of Wilcocks—and a pretty tale called Simple Susan—in short, madam, though I am always a suffering, poor creature, and though we sometimes are supperless, we are still happy, and it is all owing to that grateful, good Bessy.'

But must I tell you, Mamma, about Franklin. He has really given up a great deal for her sake: he might have been in a much richer way had he remained in America: but then, he says, what good would it all have been to away from his Bessy! They are to be married next we and my aunt and all of us are preparing different articles of dress or furniture, that may be useful presents to them. My uncle suggested some little alterations in the arrangement of the house, so as to make room, at present, for

Franklins; and he offered to assist them next spring in making it still more comfortable.

There is a farm to be let—not very good ground, but well situated, and about half-way between Fernhurst and the old man's cottage. My uncle has hopes of procuring it for the Franklins; and I am sure it will be an advantage to them to be near my uncle, his advice is so useful, and he knows so much about everything.

Some of the land is like forest ground, and has neither been fenced nor drained; but Franklin says he will gradually bring it into cultivation. I am in hopes I shall have many a pleasant walk there with my uncle; and then I shall have a good opportunity of seeing the whole process of farming.

How benevolent my uncle and aunt are! They are as much interested about Bessy as if they had always known her; and my uncle's manner is so kind and so cheerful, that he raises the spirits of the poor old couple whenever they see him.

16th.—My cousins are such gardeners, particularly Mary and Wentworth, that they have made me wish to become one too. Caroline is not so fond of gardening as the others, though she has some very pretty flowers, and labours a good deal. She has given a large portion of her garden to little Frederick, who is her particular charge. He calls himself her little boy, and he is so indeed, for she teaches him most of what he learns, reads with him, and makes herself quite his companion.

When we were gathering a few still lingering roses to-day in Mary's garden, I said that I began to think that I should like to manage a little garden as well as they did.

'Huzza!' exclaimed Wentworth and Frederick; 'I knew she would become one of us at last!'

'Oh yes,' said Mary; 'I have been expecting this; I always knew that Bertha was not really indolent. Now she will no longer sigh after

The coffee plains, the orange groves,
And flow'ry vales she so much loves.'

'And now,' said Frederick, 'to encourage the poor child, we must give her a little bit of ground rent free. I will give her a bed in my territory.'

'And I—and I,' said each; 'we must all contribute to

her garden.' 'And so must I too,' said little Grace; 'I will give her a share of my garden, and I will teach her how to shell the seeds, and then to sow them.'

When my uncle and aunt came in from riding, my cousins went in a body to tell him how they intended to manage. For that is one of the happy things in this family, dear Mamma, as I heard some one remark lately; they feel a mutual interest in each other's pursuits, and my uncle and aunt are always ready to assist them in accomplishing their little plans, whether serious or playful. There is no jealousy or mystery—all is open; and though ready to assist each other, they never officiously interfere in one another's occupations, because each has abundance of his own.

But I must continue my history. When they had told my uncle of their intended donations, he said in his playful manner, 'Most puissant friends, if I were allowed a voice in this affair, I would say that Bertha ought to have an independent portion, which she could cultivate or spoil, to her own satisfaction. If your aunt has no objection, I will give her a certain spot near Caroline's garden, which requires a good deal to be done to put it into order. A little steady employment will be of great use in breaking her into the noble science of horticulture; and she can lay out her domain to her own taste. May I hope this suggestion meets with your approbation?'

'Oh yes,' said Wentworth: 'we all approve of your amendment, Papa, though we are sorry not to have the pleasure of making a general contribution in her behalf. However, I know she will require help; and I engage to be her labourer, and do all her hard work.'

'And I,' said Frederick, 'will be her little garden boy—her slave, if she likes; for I know she comes from a country where slaves are employed.'

'Well then, Bertha,' said my uncle, 'I will show you this piece of ground; and, if you like it, you shall have it on three conditions. The first is, that you never work long enough to fatigue yourself. These creatures have been little labourers and tillers of the earth ever since their fancy, but you are not accustomed to it, and I like moderation in every thing—in work as well as in play. Condition the second—that you really learn to garden, and not blindly go through a certain routine of operation because others do. Mere imitation is a bad rule of con-

whether in gardening or any other action of life. You must learn the why and the wherefore of what you do. Condition the third—that all your implements be regularly put in their proper places every day, when you have done; and that you have a basket to carry seeds, and knife, and all other small affairs.’

I promised to adhere to his conditions; and as soon as luncheon was over, we went to the place. It extends from Caroline’s garden, towards a little stream which skirts the shrubbery, and comes very near my aunt’s flower-garden. Frederick has undertaken to connect them by a bridge, and I have already formed a multitude of plans for laying out this little spot.

17th.—Caroline has allowed me to make the following extract, from a letter that she received this morning from Hertford:—

‘There are some marine animals here which I cannot find mentioned in any of the books we have with us; and one species, my companion says, has very rarely been observed in the British seas. These animals belong to a gregarious family, and often adhere together, but in a manner that is peculiar to each species. In this new species they are linked together endways, so that the whole forms a chain. They move forwards by swallowing and suddenly emitting the water; and it is amusing to observe the whole chain, of many feet in length, swimming with an undulating motion, resembling that of a serpent. They are quite transparent, and the adhesion is so slight, that the least force separates them. We put some in a bucket of water, but they did not like the confinement, and died in half an hour.

‘That interesting phenomenon—luminous sea-water, is seen here in autumn in great brilliancy. It certainly does not proceed from any ingredient of the water itself, but from the phosphorescent property of living animals; and from what I can learn, there are a great many other tribes that possess this power of giving light, besides those described in Dr. Macartney’s ingenious paper, which you and I read together. I am informed that Sir Charles Giesecké discovered several new species on the coast of Greenland, which were not only luminous when alive, but retained this property even when broken to pieces by the violence of the sea. They have been well called the glow-worms of the

deep, by a writer, whose account of these islands has been a great assistance to me in my tour.

'I have much more to tell you on this subject when we meet; but now the wind is fair for my voyage to St. Kilda, and all hands are waiting for me.'

WEEK 7.

Extent of the precept to resist Injury—Bertha in possession of her Garden—The Dairy—The Palo de Vaca—The Birth-Day—Visit to Elmore—Traveller.

Sept. 18th.—Sunday. There was some little argument going on at breakfast, this morning, between Frederick and Wentworth, on the question of resisting injury and injustice, or of passively submitting, according to the injunction of the Gospel; and my uncle took advantage of it to say a few words on the subject, lest we should mistake between the real meaning and the figurative expression

'It has been charged against the Gospel,' he said, 'that it teaches men to feel towards their enemies in a manner which is compatible only with an abject, slavish temper, and that it directs what it is impossible to practise; not only forbidding retaliation, but inculcating patience under the grossest ill-usage; as in these passages: "Love your enemies, bless them which curse you. Resist not evil; but whosoever shall smite thee on the right cheek, turn to him the other also." But such objections can only be urged against the mere *words*; they do not apply to the *spirit* of the precept. It is a forbearing disposition—a slowness to resent—a readiness to make allowance for the passions of others, which is meant; for, in many instances, it would be totally unreasonable to take them in their literal meaning. These texts, and others of the same nature, were intended to counteract the misinterpretation of the Jewish doctors; who, because the Mosaic code enjoined exact retaliation in the punishment of crimes by the regular sentence of the judge, perverted that into a permission to indulge in private revenge; and who were notorious, also, for want of charity in their feelings and conduct to all persons not of their nation or sect. It was in consequence of these corrupt prejudices, that our Lord inculcated, with peculiar emphasis, the contrary principles of forbearance, forgiveness, and kindness, to those who had offended; and he illustrated these precepts by striking and familiar instances.

‘ It appears, from various other passages, also, that it was not the literal rule which Christ meant strictly to enforce in every instance, but the spirit of it—that is, the temper of humility, the control of all violent and selfish impulses, and the patience and submission which are the effects of self-control;—above all, the pausing to put ourselves in the place of the offender, before we give way even to just resentment; so that, by supposing the fault our own, we may consider in what light it would then appear to us, and, consequently, lead us to act towards others as we should wish to be acted by. Our Saviour meant that we should have a willingness to forgive, and that we should habituate our hearts to that amiable benevolence which disposes us, under real provocation, to pardon, and even to promote the good of those who have injured us. It is astonishing how soon we can acquire the habit of not gratifying resentment.

‘ One strong proof that it was never intended that we should understand these rules too literally is, that we find, by the instructions of our Lord to his apostles, as well as by their own subsequent conduct, that they did not recommend or practise either perfect insensibility under injuries, or indifference to their character. They occasionally resorted to such legal and innocent means of guarding their safety and good name, as were compatible with their situation and their peculiar mission. When, therefore, we see undoubted malignity in the conduct of others towards us, we are justified in guarding against its repetition; but Christianity binds us, at the same time, to moderation and to omit no opportunity of benefiting and reforming our enemy, whose heart may be softened by the control we exercise over our feelings, and who may often be changed, and rendered more Christian, merely by our forbearance.’

My uncle said he dwelt the longer upon this important subject, because every other virtue, he thinks, rests on self-control.

19th.—Well, dear Mamma, I have taken possession of my garden; and now I hope I shall not grow tired of it, or disgrace myself by having it ill kept. One part of it had been a little nursery for rose trees, rhododendrons, and other flowering shrubs. That, and the large bed near it, which is rather moist, have become very weedy: but the front beds, and the slope down to the brook, are in very good

order ; and when the annuals, which are now in seed there, are removed, I shall begin to dig. The moist bed is to be trenched ; and as this is the best time for transplanting deciduous shrubs, as well as almost all plants, I shall have plenty of work on my hands. I may have as many shrubs as I please, and I am to have advice from all these gardeners, particularly Mary, who does every thing at the right season. She has some nice cards, on which are written hints of what is to be done in each month ; and, as they hang in her room, I can easily see there what I am to do : besides which, I intend to read a little in their gardening books, that I may understand what I am about. I look forward, with great pleasure, to this new employment, though I know I shall always feel disappointed at not having my garden full of the bright and glowing flowers that I have been accustomed to see. It must look, I fear, as sombre as the forest and the valley do, when I compare them with those of my former country. But they tell me that I must not judge now of the look either of the garden or of the country, as spring will give them a very different appearance ; and, indeed, I must confess that, gloomy as the season is becoming, the well-sheltered fields, with the cattle quietly browsing, or tamely going home, at regular hours to be milked, do look exceedingly cheerful.

I have frequently visited my aunt's dairy ; and the operations there are so new to one just fresh from a country where cows and dairy are but little attended to, that I take constant interest in them. 'And the milkmaid singeth blithe' is now a familiar image to me ; formerly it was only from your description I understood it. How is it that such a precious gift as milk can be overlooked in any part of the world, particularly in one that abounds with cattle as Brazil does ; while, in some of the rocky parts of South America, the *palo de vaca*, or cow tree, is considered such a treasure ? But it is curious that I never heard of that tree till I came here. Humboldt says that it has dry, stiff leaves, and its large woody roots seem as if they could scarcely penetrate into the crevices of the barren rocks on which it grows. For several months in the year the foliage is not softened by a single shower, and its branches appear dead or dried though, when the trunk is pierced, a sweet and nourishing milk flows from it. This milk is most abundant at the time of sunrise, and the natives are then seen hasten-

from all quarters, with large bowls, to receive it. He says it is rather thick, but sweet and well tasted.

I am making myself acquainted with all the dairy operations here, so that I shall be able, if ever I return to you, to teach them to our neighbours—from the milking of the cows to the making of the butter. To show that I know some of them already, I must tell you that each cow is milked twice over, both in the morning and evening. What she first yields is called the fore-milk, and is not nearly equal to the second in richness, which is always strained separately, and set in separate pans. From this comes all the nice cream we have at breakfast and tea.

Both are skimmed a second time; and the produce is all collected in pans. When there is a sufficient quantity (that is, about every second day), this cream, which has been thus collecting, has become sufficiently acid, and is churned. My aunt tells me that the oily particles are, by the motion of the churn-dash, separated from the whey, which, together, formed the cream, and thus become butter.

This is the method here; but she says that in some parts of England it is managed differently: for the second milk is there put along with the cream collected for churning; and, by this means, instead of a poor sort of whey, which is given to the pigs, there remains a great deal of nice butter-milk, that is very nourishing and agreeable, and forms a great part of the food of the poor. My aunt says she has even seen good cheese made of butter-milk; and the Scotch, after tying it up in bags and suffering it to drain, make a favourite dish, which they eat with sugar and lemon.

20th.—Extracts from another letter of cousin Hertford's—it is dated August 22, though it only arrived yesterday—being delayed in the islands by contrary winds.

* * * * ' There is a greater number and variety of ancient remains to be found in Islay, than in any of the neighbouring islands. I saw several monumental stones, which are, as usual, attributed to the Danes; but you know these rude monuments were common to all the descendants of the great Celtic nation. There are also some of those little round hills of earth called *barrows*, some of which have been excavated and found to contain urns and ashes; the burning of the dead having been, at times, practised among the Celts.

' Some of those ancient weapons, called *celts*, made of

stone as well as of brass, have been found in this island, and also the *elf-shot*, or flint arrow-heads, the universal weapon of ancient times: what amazing patience it must have required to shape this weapon into the accurate form which it usually possesses!

‘Among other antique remains discovered in Islay, are eighteen large gold rings, which were buried in one spot. They are bent into a circular form, but not closed; and having been, at first, used by the person who found them, as handles for his drawers, they are still employed in the same way, though their value has long been known. It is supposed that they were the collars of Roman officers, and probably the spoils of war.

‘I observed a curious circumstance in this island which I may as well mention here. At its western extremity the cattle visit the beach every day at low water, and quit their pastures to feed on sea-weed. The accuracy with which they attend to the diurnal changes of the ebb-tide is very remarkable; as they are seldom mistaken, even when they have some miles to walk to the beach. They are very fond of fish, also, preferring it to the best grass. In Shetland, I am told that both dogs and horses eat fish from choice, and that this is a practice very common also in Canada.

When this part of Hertford's letter was read, my uncle said that a friend of his, who had been for some time at Stockton-upon-Tees, observed that the cattle, who always came to drink at the river when the tide was out, and the salt-water retired, calculated the proper time with unfailing precision.

21st.—I have been looking in a description of foreign birds, and I find that, besides my little favourites with pendent nests, there is another very pretty species in North America, called red-winged starling: it is found everywhere, from Nova Scotia to Mexico—but not in the West Indies. In autumn they migrate to Louisiana, in such multitudes that, flying close together, they absolutely darken the air, and three hundred of them have been caught at one end of a net. The males are distinguished by a bright patch on the wing or shoulder, and formerly, when they were worn by ladies as ornamental trimmings for their gowns, a person collected forty thousand of them in winter.

They build among aquatic plants, in places that are inaccessible; suspending their nests between two reeds, the leaves of which they interlace and form into a sort of shed or covering. To the nest they give solidity by grass bound with mud; and they line it with the softest and most delicate herbage. This little cradle is always raised above the highest reach of the water over which it hangs; and when they do not find reeds suited to their purpose, they build between the branches of a bush or shrub, but always in a swampy situation. They commit great depredations on the maize when it is just sown, and the farmers therefore steep the seeds in a decoction of hellebore, which stupifies them; but nothing can save the corn when ripe from the myriads of these birds that attack it then.

Another species is called the *Baltimore Bird*,—not because it frequents Baltimore, but from the similarity of its colours to those in the arms of the ancient Baltimore family. Its nest, which is formed of tough fibres, is open at top, but with a hole at the side for more conveniently feeding the young; and it is attached by vegetable threads or fibres to the extreme forks of the tulip-tree and the hickory. The country people call them *fire-birds*, because, in darting from branch to branch, they look like little flashes of fire.

22nd.—I have just learned from my uncle what gum lac is: I have often wished to know, but I never had sense enough to ask him till this evening. It is a resinous substance produced by an insect called the *coccus lacca*, and is deposited on the small branches of a tree, for the preservation of its eggs, as well as for the nourishment of the young maggot afterwards. As the gum is laid on, it is formed into small cells, which have as much regularity as those of a honey-comb; and in each cell there is found a little red oval egg, about the size of an ant's. When the eggs are hatched, the young grubs pierce through the gummy coat that surrounds them, and go off, one by one, leaving their *uvixæ* behind, which are, in fact, the white membranous substances found constantly in stick lac.

The lac insect is cultivated in many parts of the Mysore the East Indies, but is found only on trees of some particular species. These trees put out their leaves from the idle of March to the middle of April: during which

time a small twig, having some of these insects on it, is tied on each of them, and by the latter part of October all the branches are thickly covered with the insect, and almost all the leaves are devoured. The branches are then cut off, spread on mats, and dried in the shade. They are afterwards sold to the merchant, under the name of stick lac, and are a staple article of commerce in the Mysore, as well as in Assam, a country bordering on Thibet. The only trouble in procuring it is that of breaking down the branches and taking them to market.

The best gum lac is deep red: it comes to England in five different states:—

1. Stick lac, as in its natural state.
2. Seed lac, which is the former broken into small pieces, and appearing in a granulated form.
3. Lump lac—that is, the seed lac liquefied by fire, and formed into cakes.
4. Shell lac, or the latter substance thoroughly purified. For this purpose, it is put into canvass bags, and held over a charcoal fire till liquid enough to be squeezed through the canvass; it is then allowed to drop on the smooth bark of the plaintain-tree, to which it will not adhere, and it spreads itself there in thin transparent layers.

Gum lac is extremely useful, being a principal ingredient in varnishes, in sealing-wax, and in cements; it is also used in large quantities in dyeing silk; and, when mixed with tamarinds, it is said to make a beautiful scarlet, which is not discharged by washing.

24th.—Yesterday, you well know, dear Mamma, was my uncle's birth-day: it was not allowed to pass unnoticed, though he says the habit of marking particular days may be the cause hereafter of much pain. Be that as it may, we all were anxious to celebrate it. Little Grace repeated to him, when he came to breakfast, some very touching lines, written by Mary, as an address from all his children. Caroline presented him with his two favourite flowers—a rose and a sprig of lavender; and I followed her with a little drawing of one of the few wild flowers still in blossom—great white bind-weed, which I had often heard him admire. I felt very doubtful of venturing to offer it, but he received it with an encouraging kindness peculiar to himself.

As the day was mild and bright, my uncle hired a br

and took us all up the river, beyond the village of Elmore. We had an excellent view of Gloucester, and in the distance we saw the pretty Malvern hills.

In returning, we went on shore at Elmore, where my aunt paid a visit to a lady, whose daughters accompanied us for a visit of a few days; and lower down the river, we stopped for half an hour at Newnham, to call on Mrs. Ando, who had been an old servant of my aunt's. She is now living independently on her earnings, in a neat, comfortable house; and she is always so rejoiced to see any of the family, that a visit to her is quite a festival. We found a pretty little child playing about the room, prattling French, and looking very droll in a large Swiss hat. Mrs. Ando told us, that about a fortnight since, a gentleman and a lady, with this child, had crossed the Severn, and come to Newnham; but the illness of the poor gentleman had detained them, and as the inn was small and unfit for invalids, and the innkeeper being unwilling to let a sick man remain in the house, she had allowed them to lodge with her, out of compassion. She described them as very amiable people; they had expected a friend to meet them, but had been disappointed; and she added, that they seemed to be distressed for money.

When we returned, there was the most beautiful western sun-light on everything: cottages, trees, and the orchards full of rosy apples, were all gilt by it, and the river appeared like a sheet of glassy silver.

Soon after the dinner, the evening part of the birth-day rites began, by a merry party at French blind-man's buff. This was very amusing, for my uncle and aunt joined in it; and he was so comical, that it gave the game quite a new character. Tea succeeded; and after Grace had retired to bed, the piano-forte was opened, and we three sang for my uncle his favourite song of 'Hark, the Lark,' which we had learned, purposely to surprise him on this day. He appeared so much gratified by this little attention, which had been a happy thought of Mary's, that we were more than repaid for all our exertion to perform it well. Several other favourite songs were sung, in some of which the young ladies who had come from Elmore assisted; and when we were tired of singing, we danced reels and quadrilles, to finish the evening. Sometimes my uncle made up our number, and my aunt was so good as to play for us.

The servants were allowed to have a tea-party for their friends on this occasion; and I heard this morning that my aunt had distributed meat or clothing to all her poor pensioners. The school-girls, too, had a holiday; and books, work-bags, pin-cushions, or housewives, were distributed according to their merits. Caroline did all this part of the business.

WEEK 8.

On reading the Psalms—Oak Bark—Brazilian Forest—Ancient importance of the Forest of Deane—Eucalyptus—Miller of Breda—Humming Bird in Nootka Sound.

25th.—*Sunday.* My uncle has been giving me some instruction in reading the Psalms to-day: he thinks they are not always rightly understood—partly from the mistaken views of modern expositors, who have ascribed the immediate subject of every psalm either to the history of the Jewish nation, or to the events of David's life.

'Many of the psalms,' he said, 'do commemorate the miraculous interpositions of God in behalf of his chosen people; and many of them were probably composed upon the dangers, afflictions, and deliverances of King David. But even of those which relate to the Israelites as a nation, there are few which do not represent, in a figurative manner, the future history of the Christian church; and of those which allude to the life of David, there are none in which it is not the "Son of David" who is the principal and real subject. David's complaints against his enemies are the Messiah's complaints—David's afflictions are the Messiah's sufferings—David's penitential supplications are the petitions of the Messiah under the burden of the imputed guilt of man; and David's songs of triumph are the Messiah's thanksgivings for his victory over sin and death. In short, every part of the book of psalms has a double object.

'They go in general under the names of the Psalms of David: he probably gave a regular form to the musical part of the Jewish service; but there is good reason supposing them to be the compositions of various authors some more ancient than the time of King David, and some of a later age. Of many, he was undoubtedly the author and we know from his own words, that those of his composition were prophetic—"David, the son of Jesse, the swi

Psalmist of Israel, said, The spirit of Jehovah spake by me, and his word was in my tongue."

"The psalms are all poems of the lyric kind—that is, adapted to music, but with great variety in the style of composition. Some are simply odes, elegiac, or pathetic, or moral: but a great proportion of them are a sort of dramatic ode, consisting of dialogues between persons sustaining different characters. These persons are frequently the Psalmist himself, or the chorus of Priests and Levites, opening the ode with an introduction declarative of the subject, and sometimes closing the whole with a solemn admonition. Sometimes Jehovah himself speaks; and Christ, in his incarnate state, is personated either as a priest, or as a king, or sometimes as a conqueror; and in those psalms in which he is introduced in this latter character, the resemblance is very remarkable to the warrior on the white horse in the book of Revelations.

'If this idea were kept in the mind,' continued my uncle, 'it would greatly conduce to the right understanding of the psalms; and any reader, of ordinary penetration, would easily perceive to what speakers the different parts of the dialogue belonged.'

My uncle read to us, as an example, the twenty-fourth psalm, from Bishop Horsley's translation. 'It opens,' he says, 'with a chorus proclaiming the divinity of Jehovah, the Creator and Lord of the Universe. It then describes, in questions and answers, sung by different voices, the sort of righteousness which consists not in ceremonial observances, but in clean hands and a pure heart. And the song concludes with a prediction of the Messiah, under the image of the entry of Jehovah into his temple.'

Chorus.

1. To Jehovah belongeth the earth, and all that therein is,
The world and its inhabitants.
2. For he hath founded it upon the seas:
And upon the floods hath established it.

FIRST VOICE.

3. Who shall ascend the mountain of Jehovah,
And who shall stand within the precincts of his sanctuary?

SECOND VOICE.

1. The clean in hand, and pure in heart,
Who hath not carried his soul to vanity,
And hath not sworn to the deceiving of his neighbour:

5. This man shall obtain blessing from Jehovah,
And justification from the God of his salvation.

Chorus.

6. This is the generation of them that seek after him,
Of them that seek thy presence, O God of Jacob !

PART II.—*Semichorus.*

7. O gates, lift up your heads,
And be ye lifted up, ye everlasting doors,
And let the King of Glory enter.

A SINGLE VOICE.

8. Who is He, this King of Glory ?

ANOTHER VOICE.

Jehovah, strong and mighty :
Jehovah, mighty in battle.

Semichorus.

9. O you gates, lift up your heads,
And be ye lifted up, ye everlasting doors,
And let the King of Glory enter.

A SINGLE VOICE.

10. Who is He, this King of Glory ?

Grand Chorus.

Jehovah of Hosts. He is the King of Glory.

26th.—This is the last day of our Elmore friends—the Miss Maudes' visit: fortunately, it has been very fine, for they wished to walk through the forest; and we did ramble very far. We took them to visit the blind basket-maker and the Franklins, and showed them all the improvements that my uncle had made in the cottage; and we came home by a roundabout way, through an oak coppice, in which there are nice glades and pretty paths. In one of these glades there was an immense pile of oak-bark; and Miss Maude told me that in May it is peeled off the young trees, which are cut down in thinning the wood, and is piled up in stacks to dry till the latter end of autumn, when it is disposed of by weight. For this purpose there was a huge pair of scales set up near the stack; and on this very day they began to take it down, to weigh it, and pack it in lamats, made of a kind of *bent* grass, in which it is sewed up, and sold to the tanners at a very high price. The different groups—some weighing, some packing, and others taking it away on drays—made a very lively scene; Miss Maude and I each made a sketch of it.

While we were drawing, she asked me several questions about the Brazilian forests; and I endeavoured to describe to her the richness of foliage, and the majestic height of the trees, to which none here can be compared. I did not forget the great variety in our Brazil woods, where almost every tree was different from that next to it; while here there are not more than four or five species, which you meet again and again; nor did I omit to mention how beautifully they are ornamented, by twining and parasite plants, and yet not rendered impassable; for I repeated what I had heard a gentleman at Rio say—that such is the regularity of those great forests, that he could gallop for miles through them without being stopped by underwood.

Both she and her sister were very much interested in the account I gave of the *silk-cotton* trees, which spread out all their branches at such a height from the ground; and of the *lecythis*, with its pitcher-shaped fruit; and of the *jacaranda*, with its large feathered leaves of dark-green, which make such a contrast with its gold-coloured flowers: some species of it so very tall and magnificent, and others with such singular tufts of whitish leaves at the ends of the branches.

They encouraged me to go on; and after describing how the dark tops of the Chilian fir mingle with all these other trees, I came to the humbler shrubs and flowers, which exhibit such a wonderful variety of tints, and then to the festoons of those twining plants called *lianes*, which descend from the tops of the highest trees, or twist round the strongest trunks, till they gradually kill them.

Though many trees grow to great size here, there is certainly not that profusion of vegetation which you used to make me notice at Brazil; and there is a gravity in these English woods, which I told them is very different from the gay and flowery appearance of the woods, and even of the road-sides, in Brazil, where the hedges of myrtle, China-roses, scarlet passion-flowers, and trumpet-flowers, make so gay a mixture. The autumn tints, so much admired here, are perfectly dead, compared to those of South America.

I described also our plains, or *campas*, with the humming-birds buzzing like bees round the flowering shrubs, and the myriads of gay butterflies fluttering over the streams. How astonished these Gloucestershire people would be, if they were to see the troops of *emus*, or American ostriches,

which run with the swiftness of horses through the bushes, accompanied by their young!

Insignificant, however, as the Forest of Deane appears to me, I find that it once chiefly supplied the British navy; and was considered of so much importance, that one of the special instructions to the admiral of the Spanish Armada was to destroy it.

27th.—We had another boating party to-day, to take the Miss Maudes home. The river was quite alive, so many trading-vessels were going up. The coal-mines and iron-works in this neighbourhood employ a great deal of shipping; and the city of Gloucester is, besides, a place of considerable business.

As we boated along that part where the river makes a sudden horse-shoe bend, and skirts the forest so beautifully, the woodland scenery naturally became the subject of conversation; and my uncle, after smiling at some of my rhapsodies about 'the magnificent trees of Brazil,' told us that a friend of his, who had been in New South Wales, had described the appearance of the forests there as very peculiar. From the scarcity of deciduous trees, there is, he says, a tiresome sameness in the woods—the white cedar being almost the only one that is not evergreen in that extensive country; and besides, they have in general a disagreeable grey or silvery appearance. One of the most common trees there is the *eucalyptus*, with white bark and a scanty foliage, which is more like bits of tin than leaves; and no painter, he said, could make a picturesque view of any scene there, because the trees have no lateral boughs, and therefore cast no masses of shade. He says the Australian forests have all a very peculiar character, owing to the manner in which the two species that compose, at least, one half of the forests, turn their leaves to the light. These trees are the acacia and the eucalyptus; their leaves hang edgeways from the branches, and both the surfaces of the leaf being thus equally presented to the light, there is scarcely any difference between the front and the back.

New South Wales, he says, is a perpetual flower-garden, and, in point of size, the trees are not surpassed by those of any quarter of the globe. Amongst others, he mentions the cabbage-palm, which rises sometimes 100 feet above the rest of the forest; and another palm, called the *s. forthia elegans*, equal in size to the cabbage-tree, but r

pinnate leaves like those of the cocoa-nut. From the broad membranous spatha of the flowers, the natives make water-buckets, by tying up each end, just as they make their bark-canoes. The farmers use them for milk-pails; and of the leaves both hats and thatch are made: so that, altogether, this *seaforthia* seems as useful as it is elegant.

The Miss Maudes having alluded to the description I had given them yesterday of the difference between the woods in England and Brazil, my uncle said that young people did well to make such observations, and to acquire a general idea of the productions that characterize the great divisions of the globe. He added that, on all subjects of natural history, it is not enough to amuse ourselves with details, or to accumulate mere facts, however valuable; they should be classed in our minds; we then perceive the leading distinctions, and we become able to trace every new fact up to some general cause. This, he says, may be called gaining a sort of double knowledge—at least, it is making knowledge doubly useful.

28th.—I send you a long extract from the last of Hertford's Western Isle letters. He is now at Edinburgh.

'I have been at the island of St. Kilda; the passage to it was stormy and dangerous, which kept us always on the look-out. St. Kilda is so remote and solitary, that I had expected to find it more interesting than it is in fact, for I had hoped to find some peculiarities among the inhabitants, in which I might trace the olden times. Unfortunately, the clergyman was absent; and as the inhabitants have not learned to speak English, we could not have any very satisfactory intercourse with them.

'They were a little alarmed at first by the sight of strangers, and fled in all directions; but they soon became calm, and treated us very hospitably. They seemed to be a most innocent, contented set of people—about a hundred altogether—and were very comfortably dressed. They use the quern, or hand-mill, as in all the Hebrides, to grind their oatmeal and to make their snuff. Their usual snuff-box is a simple cow's horn, stopped at the large end, and a small piece cut off at the point, to let out the snuff, where they fix a leather plug. This is still called a *snuff-mill* in Scotland, for they formerly used a machine attached to like a nutmeg-grater, which made the snuff as often

as a pinch was required; and my companion says that this is the custom also amongst the shepherds of the Alps.

'Their houses are constructed without mortar, for there is no lime on the island; the stone walls, which are raised only three or four feet from the ground, are double, and the interval is filled with earth. In the walls there are several recesses, each covered by a flag; and in these holes, like ovens, the people sleep. The windows and chimneys are simple openings in the roof—from which also hang their implements of husbandry, as well as of bird-catching, with their ropes and fishing-rods, &c., and many long bladders, containing the oil of the *fulmar*, to supply their lamps, and also to use as a medicine. Every person has a dog, a small rough species of the Highland terrier, which scrambles along the cliffs, and creeps into the holes of the Ailsa rocks, which live in the ground, like rabbits.

'As to music, for which St. Kilda was famous, I am sorry to say that neither bagpipe nor violin were in the island when I was there: the airs, it is said, are very plaintive, like the generality of Highland music.

'The mode of preserving the peat in winter, and also the corn and hay, is ingenious, and peculiar, I am told, to this island. They are kept in buildings, which, from their domed shape, appeared most extraordinary, till I discovered their purpose. They are the first objects visible on approaching from sea, and I, of course, thought they were the dwellings of the natives. The sides admit a free passage of air, but the roofs are rendered water-tight by a covering of turf; the domes are formed by the regular diminution of the courses of masonry, and the whole is closed and secured at top by a few large heavy stones.

'The bird-catchers of this island have long been celebrated. The puffins are caught in their burrows by the dogs, and the chase is usually managed by the children, while the men are engaged in the pursuit of more difficult game. Gannets, or Solan-geese, and other large birds, are taken by hand, or with snares, on their nests; for what purpose the bird-catchers descend the cliffs, by the assistance of a rope, which is sometimes made of hair, or sometimes of slips of twisted cow-hide.

'A party, who were provided with these ropes, led me to the brink of a precipice, of such a height, that the

dashing against the rocks below, was not heard above. Several of the ropes, having been tied to one another, to increase their length, the man who was going down fastened one end of it round his waist, and the other end he let down the precipice, to about the depth to which he intended to go; then giving the middle of the rope to a man to hold, he began to descend, always steadying himself by one part of the rope, as he let himself down by the other. He was supported from falling only by the single man above, who merely held it in his hands, and sometimes with one hand alone, looking at the same time over the precipice, without any stay for his feet, and conversing with the young man as he descended. In a short time, however, he returned, with a fulmar in his hand: it was placed on the ground, and a little dog having been set at it, the angry bird repeatedly cast out quantities of pure oil in the dog's face.

'I accompanied the same party in one of their night expeditions, as far at least as the edge of the precipice, in order to see them catch the Solan-geese. These wary birds have always a sentinel to keep watch; the object is, therefore, by surprising him, to prevent his giving the alarm. For this purpose, the catcher descends the rock, at some distance from the sentinel, and then passing along horizontally, comes upon him unperceived, and so quickly breaks his neck, that the other birds are not roused. He then quietly removes one into the nest of another, which causes an immediate battle: this disturbs all the geese on the rock, and while they are gaping at the combat, they are easily caught: the man twisting the necks of as many as he chooses, and thrusting their heads into his belt. Eight hundred are sometimes taken by this method in one night. There is a loose skin under their bill, in which these birds can carry four or five herrings at a time, besides sprats, which the young pick out with their bill, through the mouth of the parent, as with a pair of pincers. When the gannets observe a shoal of herrings, they close their wings to their sides, and precipitate themselves head-foremost into the water, dropping just like a stone. Their eye is so exact in doing this, that they are sure to rise with a fish in their mouth.

I must also mention the *Foolish Guillemot*. A rock-noddy descends at night by his rope to the ledge of a precipice, where he fixes himself, and tying round him a piece

of white linen, awaits the approach of the bird, who, mistaking the cloth for a rock, alights on it, and is killed immediately. This silly bird lays but one egg, and without any nest to protect it: so that, when disturbed, she frequently tumbles it down the rocks as she rises.'

29th.—I have been labouring most diligently at my garden, and many a time did I wish that my Mamma and Marianne could have seen how much the indolent Bertha, as she used to be called, is improved in activity and in real strength. I was preparing a bed for hyacinths—taking out the old soil, and putting nice fresh earth, mixed with sand, in its place. Wentworth helped me to dig out the earth, and Frederick and his wheelbarrow were for a long time busily employed in taking it away. My annt had given me the bulbs, and we were anxious to complete the job before the weather should become too wet.

My uncle paid us a visit, and seemed pleased with us all: he likes to see that sort of patient perseverance—it is more valuable, he says, than genius; and in the evening he read to us the following anecdote from Bakewell's Savoy, to show how much may be done by it.

'The mineral waters of Breda were formerly covered by a sudden inundation of the river Isere, and lost. In the summer of 1819, the breaking down of the side of a *glacier*, in one of the upper valleys of that river, produced another inundation, which brought down with it an immense quantity of stones and earth, that blocked up the river and forced it into a new channel. A miller and his family, who lived on the banks, narrowly escaped with their lives, and most of his little property and all his winter stores were swept away. He was then an old man; but nature had given him that resolute spirit which regards common calamities only as motives for additional exertion. He lost no time in useless lamentations, and immediately began, not only to repair, but to improve, and to provide, as much as possible, against a recurrence of similar misfortunes. He excavated, with his own hands, a large cellar in the rock near his mill, partly by the pickaxe, and partly by blasting with gunpowder, and there his stores and winter provisions were safe from any power of destruction less formidable than an earthquake.

'But this industrious man had long been the wonder of the *commune*. One of his performances, that almost exc-

belief, was the removal, in 1796, of an immense block of marble, and the working it into a millstone for crushing walnuts. The block had fallen into the valley, about three hundred yards from his mill. He had often viewed it with a wishful eye, but to remove it seemed beyond his power; he was, however, then in the vigour of life, and he resolved to attempt it. He began by cutting the stone into a proper form, which was a labour of many months: when this was done, by the aid of his wife, his mother, and his servant boy, and with some miserable pulleys, he contrived, for several successive weeks, to move it a few inches, or a few yards, every day, according to the nature of the ground, till at length he brought it safely within his mill. It is about nine feet in diameter, and three feet in thickness, and cannot weigh less than fourteen tons, as it contains about 189 cubic feet of marble. The removal of this huge stone, with the very slender means by which it was accomplished, is a striking instance of what labour can effect by unremitted perseverance.

‘In the winter which followed the last inundation, his wife observed steam constantly rising from the opposite bank of the river, and, on going to the spot, she found a considerable spring of hot water, which, being examined, and found to be mineral, baths were established there. Mr. Bakewell adds, that being desirous that this industrious miller should derive some advantage from his wife’s discovery, he recommended his keeping mules to let out to the bathers, and cows to supply them with milk, during the season. With these suggestions he was much pleased, and should he adopt them, it will be equally advantageous to visitors at the baths as to himself, as there was neither horse nor mule to be hired in the place; and in the summer months, as all the cattle are pastured in the mountains, milk can be procured only once or twice a week.’

Oct. 1st.—I have just read such a pretty description of the humming-bird, that I must copy it for Marianne: it is from Buffon, who calls this bird *l’Oiseau Mouche*. ‘Of all animated beings,’ he says, ‘it is the most elegant in form and the most brilliant in colours: our precious stones cannot be compared in lustre to this jewel of Nature, who has bestowed on it all the gifts which she has only shared amongst other birds. Lightness, swiftness, grace, and the most splendid clothing, all belong to this little favourite.’

'The emerald, the ruby, and the topaz, sparkle in its plumage, which it never defiles with the dust of the earth, and scarcely even deigns to touch the green turf for a moment. It is always on the wing, fluttering from flower to flower, and possesses their freshness as well as their brilliancy. It lives on their nectar, and only inhabits those climates where flowers never cease to bloom.

'It is in the warmest regions of the New World, that all the species known of these birds are found; for those which advance in summer to the temperate zones only remain there a short time. They seem to follow the sun—to advance and retire with him; and to fly on the wings of Zephyr in the train of an eternal spring.'

I thought we had in Brazil the smallest humming-birds that were known; but I have read in Mr. Bullock's very entertaining book, that he procured one in Jamaica that was less than even some species of the bee. It had taken its station on a large tamarind-tree, which was close to the house, and overspread part of the yard; there it spent most of the day, and kept absolute possession of its dominions; for the moment any other bird, though ten times larger than itself, approached the tree, it furiously attacked and drove off the intruder—always returning to the same twig, which it had worn quite bare by continually perching on the same spot.

Mr. Bullock observed these birds feeding on insects—which contradicts the general idea that they live only on the honey of flowers. When he was in Mexico, one of them took possession of a pomegranate-tree, and sat on it the whole day, catching the flies that came into the flowers; and on dissection he has found other insects in their stomach. Though naturally petulant, and very tenacious of intrusion, they seldom quarrel in captivity: for example, when a great blue-throated humming-bird occupied the perch, he has seen the diminutive Mexican star settle on its beak, and quietly remain there for some instants, without the insult having been resented. In the air, indeed, they fight desperately till one falls; and Mr. Bullock witnessed a battle in heavy rain, every drop of which he thought would have been sufficient to beat the little combatants to ground.

They are still worn by the Mexican ladies as ornaments for the ears; and their name in the Indian language is

fies 'Beams, or locks of the sun.' But he says, what is very true, indeed, that the stuffed humming-birds can give but little idea of their real brilliancy; for the sides of the fibres of each feather being of a different colour from the surface, the least motion of the bird continually changes the hue. For example, the topaz-throated humming-bird of Nootka Sound is ever varying from a vivid fire-colour to the bright green of the emerald.

They are very cunning little things. The house in which Mr. B. lived was of one story, inclosing a garden, round which it was built. The spiders had spread their numerous webs from the tiles of the projecting roof to the trees in the garden, so closely that they resembled a net. The humming-birds endeavoured to seize on the entangled flies; but, afraid of entangling their own wings, and perhaps a little alarmed by those great spiders, they would fly rapidly round and round, as if to reconnoitre the best avenue; then darting in, they picked out the smallest fly, and escaped without touching a single thread.

I was surprised to find that some of these birds were found as far north as Nootka Sound; and I asked my aunt if she thought there was any mistake in the name of the place. She said, that though the winters are very severe in that part of America, the summer is extremely hot; and she added that an intimate friend in Upper Canada, with whom she corresponds, mentions the humming-birds as being constant visitors in summer. I had not before heard that she had a correspondent there. How interesting, said I, must her letters be from those frozen regions, where everything is so different from the part of America in which I have lived! 'I will show you her letters with pleasure,' replied my aunt, 'and I hope, at some future time, you will know the amiable and excellent writer herself.'

WEEK 9.

Monday—On Passages of the Bible apparently contradictory—Tribe of Grasses—Bulbs—The Lumley Family—Halcyon Days—Various Character of Forests—Sago Tree—Silk-thread Palm—Fishing Nest.

2nd.—Sunday. In speaking to-day of reading the Bible, uncle regretted that indolence so often prevents people, when they find difficulties, or apparent contradictions, from giving a little trouble to try to reconcile them. 'How often,'

said he, 'by a small degree of attention, might we perceive that the seeming disagreement arises from some oversight of our own, and that it might be made quite clear by a little reflection !

'For instance: in 1st Kings vii. 26, it is stated that the molten sea contained *two* thousand baths: while in 2nd Chronicles iv. 5, we are told that it received and held *three* thousand baths. Now the case is this: the writer of the book of Chronicles states that ten lavers of brass were made, which joined the molten sea. "Five on the right hand, and five on the left, to wash in them; such things as they offered for the burnt-offering they washed in them, but the sea was for the priest to wash in."

'Hence it appears that the molten sea, with its appendages, the lavers, were altogether for the washings; but each part was appropriated to distinct purposes—the lavers for the washing of burnt-offerings, and the sea for the washing of the priests; as it would not have been proper for the priests to have washed in the same water in which the burnt-offerings were washed. The lavers are not noticed in the Book of Kings, in which the contents only of the sea are alluded to—but in Chronicles you perceive they are both mentioned. The lavers received one thousand baths, exactly the difference which makes these accounts appear contradictory—but which is completely explained by observing that a part only of the sea is alluded to by one writer, while the other describes the whole of it.'

My uncle mentioned some other passages in the Old Testament which are misunderstood, in consequence of some slight inaccuracy in the English construction. I think I can give one of them nearly in his words:—"In 2nd Chronicles, chap. ii. an astonishing number of men are said to have been employed in building the Temple—a number that at first sight appears incredible, supposing them employed on the Temple only. But we are told by the learned, that the original does not signify that they were all employed on what, properly speaking, was called the Temple, or inner-house, where the cherubim were kept. The expression applies equally to the outer division before the v which was called the *greater house*; and we are therefore to consider that all the buildings attached to the Temple are included in this account of the employment of the workmen. Now the buildings around the whole area, where

temple stood, were intended, not only for the residence of the priests and Levites, but were also adapted to contain their portion, or tenth, of the produce of the land; and certainly, for these purposes, the out-buildings must have been very capacious. And besides, we must recollect that great numbers of men were necessarily occupied in quarrying stones for buildings of such extent, as well as in preparing the materials for fitting up the interior.'

When my uncle had finished this satisfactory explanation, Mary said that she had lately been comparing the history in the books of Kings and Chronicles, and that she had met with a little difficulty. In 1st Kings ix. 23 we are told that the number of chief officers over Solomon's work was five hundred and fifty: but in 2nd Chronicles viii. 10 they are said to be two hundred and fifty. 'Now, papa,' said Mary, 'I know you can clear up this difficulty.'

'The accounts do seem contradictory,' said my uncle, 'yet both are correct. You see in 1st Kings v. 13 that Solomon levied out of all Israel thirty thousand men. This army was divided into tens, and every tenth man was an officer. These three thousand officers, if divided by twelve (the number of the tribes), will give two hundred and fifty chief officers, according to Chronicles. But we had been already told (chap. ii. 18) that Solomon employed one hundred and fifty thousand workmen, and that over them he appointed three thousand six hundred overseers. These overseers were regulated in the same manner as the officers of the army: and, therefore, if three thousand six hundred be divided by twelve, it will give you three hundred chief officers; which, added to the two hundred and fifty selected from the guards, makes five hundred and fifty officers that bore rule over the people, according to your quotation from the first book of Kings.'

3rd.—I had a nice walk with my uncle to-day to farmer Moreland's, with whom he had some business. As we passed through the field in which there had been meadow this year, my uncle made me observe what a fine growth had sprung up since it was mowed; the after grass he called it. I asked, whether he did not consider the grasses as amongst some of the most useful plants?

He said, 'The tribe of grasses yield more sustenance to man, and to the larger animals, than all the rest of the vegetable kingdom put together. Their herbage is per-

petually springing, and it is adapted to almost every soil, climate, and situation. The grasses are a very extensive tribe, and yet, throughout the whole of it, nothing poisonous or injurious is found, except, perhaps, the stupefying quality attributed to the seeds of the *lolium*, or rye-grass. The farinaceous produce of wheat, rye, barley, rice, maize, and many others, supplies mankind with the most general and wholesome nutriment.'

As we walked along, I showed him quantities of wild ranunculus mixed with the grass, and I asked, whether there was not any way of preventing the growth of all those weeds. He answered, that a certain proportion of what we vulgarly called weeds are now considered useful in making the grass more palatable to cattle, and even more wholesome—'Just in the same manner,' said he, 'as men could scarcely live on flour alone, so cattle cannot be well supported by mere grass, without the addition of various plants, in themselves too acrid, bitter, or narcotic, to be eaten unmixed. Salt, spices, and a portion of animal food, supply us with the requisite stimulus or additional nutriment; and, in the same manner, the ranunculus tribe, and many other plants, season the pasturage of cattle.'

My uncle afterwards told me, that some of the grasses run chiefly to stalks, the leaves decaying as the seed advances towards perfection: such as rye-grass, dog's-tail grass, and fine bent; while others, whose leaves continue to grow after the seed is formed, retain their verdure and juices during the whole season, as in the *poa* and fescue tribes, whose leaves are green and fresh, when the seeds are ripe. Ignorant farmers do not attend to this, and often, in mistake, sow those very grasses that run all to stalk and seed. Besides the numerous families of real grasses, there is also a great variety of plants cultivated by farmers, to supply their places, which are, therefore, called the *artificial grasses*.

'In some cases they are of more rapid growth than a crop of grass—in others, the change is of use to the soil. Sanfoin, for instance, of which you see so much in Gloucestershire, is found to be particularly adapted to a soil exhausted by repeated corn-crops, because its root enters deeply into the ground, while the fibrous roots of corn spread close to the surface. Lucern, clover, vetches, and other succulent and quickly-growing plants of this nature,

are also called artificial grasses—and are thus of great advantage to the farmer, by supplying his cattle with excellent food, and, at the same time, by alternately giving rest to different portions of his ground.'

4th.—Some visitors have just arrived; they are to spend a week here, and I am sure we shall not go on half so pleasantly, for these people will interrupt all our employments, and will, I suppose, be very formal. I said so to my aunt this morning, and I was surprised to find that she was not of that opinion; I thought she would particularly dislike having the regular, happy life here deranged.

I have been very busy in my garden this morning. With some help I have completed the little flower-beds, which I intend shall be so pretty next spring—they are intermixed with grass-plots, and are made up of good, fresh earth, properly prepared for the plants they are to contain. Mary, who seems to have a great deal of knowledge, has assisted me—for I find that much of the art of gardening consists in suiting the soil to the nature of the plants. In my jonquil bed she advised me to put abundance of sand, and no manure. This has been done; and this fine mild dry day I planted it with the bulbs as she directed me. I have a narcissus bed, too, and this has been made up with what the gardener calls hazel-loam and a small portion of manure. These two beds, along with one for hyacinths, that I described before, and one for carnations, make up what I call my regular flower-beds, on the upper part of the sloping bank. Besides these, I have two beds at one side, one for roses of different kinds, and one for white lilies. These last have, I am told, very magnificent flowers, and in order to have them very fine, a great deal of fresh manure has been dug in to nearly two feet in depth.

Some days ago, I planted a number of rose-trees, contributions from all my kind friends. I have also made little edgings to all my beds, and I am now, like a mere child, already longing for the time when I shall see them covered with blossoms. But I have not nearly done yet all that I intend; for I heard a gentleman, who comes sometimes to see my uncle, Mr. Biggs, telling him of such a variety of nice plants, and the modes of managing them, that I am determined to try some of the things which he mentioned. I must first consult my uncle, because I have great plans in view; but I am afraid all these strangers will prevent him from having time to listen to me.

I find that this is a busy season in the garden, though the decline of the year, and that several plants, and almost all deciduous trees and shrubs, should be transplanted now. I have quite got into the spirit of gardening, I think; it is indeed a delightful occupation to the mind, as well as the body. There is not only much to think of, and to remember to do at the right time, but also to know why it should be done.

Tuesday night.—Though I am tired after all my hard work to-day, I must tell you, Mamma, before I go to bed, that I see how foolish it is to judge of people in a hurry, or to think strangers must be tiresome, because they interrupt our usual habits. The strangers who arrived to-day appear to be very pleasing; Mr. Lumley, who has travelled a great deal, has many entertaining things to tell; and his daughters, and their mother also, are very nice people. They brought some pretty kinds of work with them, and I was glad to find that we might employ ourselves, instead of sitting up stiffly and formally.

5th.—I mentioned last night, that the Lumleys seemed to be a very agreeable family; yet, when I woke this morning, I felt that some of my apprehensions were returning. Night, however, has come round again, and I must tell you, dear Mamma, that we have passed the day most pleasantly; partly in our usual occupations, for I found that my cousins never neglect those which are most important, for any guests whatever; and partly in walking and in gardening.

The Miss Lumleys pleased me very much, by appearing interested in the progress of my garden, and they even helped me to transplant several of my flowers. Then came my uncle and Mr. Lumley; they examined every part of my garden, and asked me several questions. My uncle inquired about the new scheme of which I had been talking, and said he would assist me as much as possible. I showed him the old quarry, and boldly described all that I intended to do—frequently referring to hints I had picked up from his conversations with Mr. Biggs. My uncle said he was rejoiced to find that I could attend so well to general conversation, and gave me the quarry to reward me. When I had finished what I had to do in my garden, he and Mr. Lumley took Frederick and me to walk with them, and heard numbers of entertaining things,—much more than I can now put in my journal.

We left the forest, and passing through the open fields which lie between it and the Severn, we walked for some time close by the edge of the river. I saw a beautiful bird sitting on a projecting stone, and we all stopped to observe it; sometimes fluttering its wings, and exposing its brilliant blue, green, and red plumage to the sun. It then took wing, and hovered in the air for some time, watching for the moment to dart on its victim. At last we saw it make a spring of twelve or fifteen feet upwards, and then drop perpendicularly into the water, where it remained several seconds. It was a kingfisher, which Mr. Lumley told me is a very common bird on the continent. He says it is shy and solitary, frequenting banks of rivers, where it will sit still for hours, as we saw it. It usually takes possession of a hole in the bank, which had previously been made by a marten or a mole, and which it enlarges a little for its own purpose. The hole has generally an ascending direction, and penetrates two or three feet in the bank; at the end it is scooped into a hollow, where quantities of small fishes' bones are often found. Mr. L. has seen these nests frequently; and he told me that as the old birds appear to have nothing in their bills when they feed their young, it is thought that they discharge from their stomach the requisite nourishment.

There are several species, but this one is the *halcyon* of the ancients, which poets imagined had a floating nest endowed with power to calm the winds and seas. Some of the gravest of the ancient writers relate, that it sat only a few days, just in the depth of winter, and that during that period the mariner might sail in full security—whence the expression, '*halcyon days*.'

Mr. Lumley has studied the habits even of the despised house-sparrow, which, however, he does not at all despise; for he says that it is a most useful creature, destroying various kinds of grubs that would be most injurious to our crops. Though it generally builds in holes and gutters, and under the eaves of houses, yet it sometimes builds in the top of a tree; and then its nest, which is carelessly formed, because in a place where it is protected, is made as large as a man's head, with a cover to keep off the rain. It is composed chiefly of hay and straw, but warmly lined with feathers, and fragments of thread or worsted, bits of cloth, or any material that can be picked up about a house;

and should their nest be destroyed, they will build up another in twenty-four hours.

In some parts of France, Mr. Lumley saw earthen pots hung out of houses for the sparrows to breed in, for the purpose of having a supply of young sparrows for the table; and it is said that the kings of Persia have them trained to hunt the butterfly.

6th.—My uncle and Mr. Lumley have been conversing to-day about the trees and woods of Europe. I had been saying so much to my cousins lately about the forests of tropical countries, that it was delightful to hear them continue the subject; and finding that I listened, they tried to make me comprehend all they said.

They remarked that each region of Europe may be distinguished, in some degree, by the different character of its forests; the pine and birch being invariably found in the cold northern countries; the lime, beech, ash, oak, chesnut, and walnut in the temperate regions; and approaching the warmer climates, the cork tree and the olive.

The most useful of the tree families are bountifully extended, said my uncle, from nearly the frigid to the torrid zone; and if we do not possess the rich variety of the tropical regions, the palms, the teak, the mahogany, the banyan, and the baobab, yet are we, on the other hand, provided with some tribes that cannot be surpassed in usefulness or in beauty. And it is worthy of remark, he added, that some one species of the oak and of the pine, those two most useful trees, is to be found in every climate of the earth, excepting in the immediate polar regions. The woods of northern Russia, of Norway, and Sweden, consist, with little variation, of the pine tribe. The Scotch fir retains its dense foliage during the long winter, and affords shelter to the wild animals of the forest; and the greater the intensity of cold, the firmer and more dense the timber becomes in texture. This tree supplies the peasantry with their cottages, their boats, and their fuel. Tar, rosin, and turpentine are extracted from it by very rude methods of distillation and its ashes produce potash. On the mountainous rang of the Alps, the Pyrenees, and the Apennines, it grows luxuriantly at the elevation where the temperature is similar to that of the northern regions. In the mountains of Thibe which are now considered the highest in the world, a different species of pine flourish; and even at the elevati

of 12,000 feet, forests of pine are found mixed with birch and rhododendron.

In Finland, and in the neighbourhood of Petersburg, the birch, which comes next to the pine in quantity, is inclined to grow by itself; but it abounds in the natural woods of Great Britain and of other parts of Europe. In the central parts of our continent, elm, maple, and ash are common, and grow to a noble size; but their extent is small in proportion to the northern forests of birch and pine, and they seem to prefer an open situation. In the sheltered parts of Savoy and Switzerland the walnut is a very profitable as well as ornamental tree; and the olive flourishes on the sloping sides of the hills, particularly in Italy. In low and warm situations there, the cypress and poplar grow to a great size—above them comes the chesnut—and still higher, approaching the pines, appears the magnificent oak. The gray foliage of the olive gives a peculiar appearance to the country; and the cork-tree, also, Mr. Lumley says, excites the admiration of all travellers. Spain, Portugal, and the South of France, are the countries in which this beautiful tree is most prominent: it grows higher than the oak, of which it is a species, and has more slender branches and smaller leaves. The chief distinction is the spongy bark, which the tree throws off naturally; and it is said that the growth of the tree is improved by peeling it.

Besides the common and well-known uses of the bark, he told us that it is employed in Portugal for beehives, for covering stables, and for many domestic purposes. Near Cintra he saw a convent built between two perpendicular rocks which actually formed the outer walls; and the monks, by neatly lining them with large flat pieces of cork, had effectually excluded all dampness. The timber is employed for the same purposes as oak; the acorns fatten immense droves of hogs; and the acorn-cups of this useful tree are one of the principal ingredients in tanning the Portuguese goat-skins.

Cork-trees are found in great perfection in the South of France. From Bayonne, where the low sandy heaths called *les Landes* commence, extending as far as Bordeaux, the woods consist almost entirely of that tree, and of the *pinus maritima*, which is scarcely less useful. The wood is excellent, and yields an extraordinary proportion of turpentine, resin, and tar, the fruit contains a kernel, which has a

pleasant flavour of the almond, and is often used in cookery; and from the root is obtained a brown dye, which the fishermen use to preserve their nets. They are, however, in many parts of that tract of country, prohibited from touching the roots, because their long matted fibres, by running along the surface, fix the loose sand, and prevent its blowing away.

Mr. Lumley spoke with admiration of the woods of Old Castile, particularly of the fine evergreen oaks and the bushy laurel-leaved *cistus*, neither of which he has seen anywhere else in such beauty. The acorns of the former, when roasted, form a large part of the food of the poor peasantry.

7th.—Mr. Lumley and my uncle have been studying Dr. Richardson's remarks on the climate of the Hudson's Bay countries, and I have noted for you all I could understand.

In the neighbourhood of Fort Enterprise, lat. 64° N., the white spruce advances nearer the northern limit than any other pine. The largest of those trees were between eight and nine feet in circumference. The elm, ash, sugar-maple, and arbor-vitæ extend to nearly the same latitude.

Oak and beech terminate about lat. 50°. The balsam poplar sends straggling trees as far north as lat. 63°; and the aspen grows in pretty large clumps a degree farther north, beyond which it was not seen. The balsam poplar forms a large proportion of the drift timber observed on the shores of the Arctic Sea, and is supposed to come principally from Mackenzie river.

Fort Enterprise was supposed to be elevated about 800 feet above the Arctic Sea, and the banks of the river on which it was built are ornamented with groves of the white spruce tree. On each side of the river, an irregular marshy plain extends to ranges of unconnected hills, at the base of which there is commonly a thin stratum of mountain peat. The bottom of the valleys is generally occupied by lakes of a considerable depth, which are entirely land-locked, and communicate with each other only when flooded by the melting snow. The sides of the hills, and all the drier spots of the valley, are clothed with a beautiful carpet of lichens, which form the favourite food of the reindeer; a some shrubs, such as the great bilberry, the marsh ledum, some of the willow tribe, and different species of *andromeda arbutus*, and the *kalmia glauca*, frequently enliven the scene.

In sheltered situations, where the peat is deeper th

usual, a few starved larch and black spruce are scattered. There are also thin clumps of the paper birch on the borders of the rapids, as well as of the white spruce, which thrives better there than any other tree; but all are of slow and stunted growth. Of the spruce cut down at Fort Enterprise, the increase seemed to have been in general at the rate of four rings, or years, to one inch; and though the house which the travellers built there was only 24 feet wide, it was with difficulty they obtained half a dozen beams of sufficient length, the trees tapered so much.

It appears by Dr. Richardson's tables, that up to the 20th of June, 1821, there was no appearance of vegetation among the flower-bearing plants, except the gradual opening of the willow catkins. Early in June, the first, or female band of reindeer passed to the northward of lat. 65°; their progress seemed to be regulated by the uncovering of the lichens. When the thaw is much farther advanced, the lichens become too tender and pulpy, and the deer resort to the swamps to feed upon the grass, or rather hay, which having been frozen up in the preceding autumn, retains its sap and nutritive qualities, when the snow melts from around it in spring. In a few days, however, the stalks become dry, and the seeds are shed; but the deer by that time have reached the sea-coast, where other plants supply them with food, which, however, are not so fattening as the lichens.

On Midsummer-day the dwarf birch opened its buds; a fortnight afterwards the ice on the larger lakes broke up, and several plants flowered. But on the 5th of September a storm set in, which clothed all the country with snow for the winter; and in the beginning of October the party again walked over the lakes which they had crossed on the ice in the middle of June; an interval of only 116 days.

The sap of the trees and shrubs freezes there in winter; and the wood becomes so hard that the chips produced by an axe flew off more like splinters of stone than of wood.

In all those dreary districts there are no traces of the influence of man over the appearance of the vegetable kingdom. Cultivation is entirely confined to a few small gardens at the fur-posts; and the only mode in which the arts and customs of the natives affect the vegetable kingdom, is by their setting fire to the forests. These fires spread rapidly in summer, and are only extinguished by heavy rains. Years elapse before anything grows in the places thus laid waste,

The branchless trunks of the burnt trees are, in a season or two, stripped of their bark, and bleached, if not sooner thrown down by the wind. The surface of the ground in time acquires a little verdure from a few mosses and lichens; other vegetables take root; and, at last, the place where a pine forest had been is occupied by dense thickets of slender aspens. The growth of this tree,—instead of a renewal of the pine forest, which might have been expected,—is a curious circumstance, and can be attributed only to its winged seeds favouring their dispersion.

I hope what I have written will amuse you, as in your last letter you wished to hear something of the discoveries made by Captain Franklin's party.

8th.—I have much to tell you, dear Mamma, of all that we have seen and done this day; some of it quite out of our usual course, for we went to see a magnificent place, about nine miles from hence, belonging to Lord S——. My uncle, Mr. Lumley, and all my cousins, rode, except Frederick, who came in the carriage with us. The grounds and woods are extensive; but the gardens, stove, and conservatory, are remarkably fine, and were our chief object. Few private gardens have such a collection of the palm tribe, and of South American plants. I saw many of my old Brazilian friends; and many plants and trees from Brazil, and the neighbouring countries of which I was quite ignorant.

The house where the palms are kept was built on purpose for them, of an uncommon height; and Lord S—— has endeavoured to arrange the numerous specimens, as well as he could, according to Humboldt's division of the tribe: the first, those which grow in dry places or inland plains, such as the fan-palm; secondly, those on the sea-coast, as the cocoa-nut, &c.; next, the palms which flourish at the elevation of 1400 to 3000 yards above the sea, and which were unknown till Humboldt's visit to the Andes; and, fourthly, those of fresh-water marshes, as the *Mauritia* palm. This is the sago-tree of South America: it extends along the swamps as far inland as the sources of the Oroonoko, and supplies the inhabitants with flour. In the season of the inundations, these clumps of *Mauritia* appear as if rising from the bosom of the waters. They serve as habitations for a tribe of wretched Indians; and as they grow in great abundance in the low grounds of the Delta, at the mouth of the Oroonoko, strangers sailing up the river at night are

astonished at seeing the tops of the trees illuminated by large fires. The poor natives suspend strong mats between the trunks of the trees, and fill them with moist clay, on which they kindle the fire necessary for their household wants. These people have preserved their independence, and probably owe it to the quaking and swampy soil which they alone know how to pass over to their dwellings in the trees.

This Mauritia palm is called the Tree of Life by the missionaries; for it not only affords the Indian a safe dwelling, but supplies him with food and wine, and cordage. Its fruit and farinaceous pith supply food—its saccharine juice ferments into wine, and the fibres of the leaf-stalks furnish thread fit for weaving hammocks, or twisting into ropes. How very singular, Mamma, to see a whole nation of human creatures depending on one single species of palm-tree for their existence!

We had much conversation about the various species of palms which we saw; and particularly the real sago-tree, which grows in the East, and which exceeds all other plants in the quantity of nutriment it affords to mankind. My uncle told me that a single tree, in its fifteenth year, sometimes yields six hundred pounds weight of sago or meal; for the word sago signifies meal, in the dialect of Amboyna. Mr. Lumley said that, as these trees grow about ten feet asunder, an English acre could contain four hundred and thirty-five of them; and, supposing their average produce to be only one-third of what my uncle mentioned, it would amount to eight thousand seven hundred pounds yearly of meal from each acre. This, he said, was three times as much as would be considered a good crop of corn in this country. Sago is collected from five different palms, but not in the same abundance as from the real sago-tree.

We then examined some fine specimens of the date-trees so famous in all our Eastern tales, and so delightful to all travellers. Mr. Lumley has often seen it near Lisbon, where it grows well; but the fruit never ripens perfectly in Europe. It is found in great abundance in Africa, and particularly on the borders of the vast desert of Sahara, where the parched sandy soil is so unfit for the production of corn. But the date-tree supplies the deficiency, and furnishes the inhabitants with almost the whole of their subsistence. Forests of this most useful palm may be seen there, of several leagues in circumference: their extent, however,

depends on the quantity of water that can be procured, as they require constant moisture. The Arabs say these trees are very long-lived; and there is scarcely any part of them which they do not make useful. The wood, though of a spongy texture, lasts such a number of years, that they say it is incorruptible; most of their instruments of husbandry are made of it; and though it burns slowly, it gives out great heat. The Arabs strip the bark and fibrous parts from the young trees, and eat the substance in the inside of the stalk. It is nourishing and sweet, and is called the marrow of the date-tree. They eat also the young leaves with lemon-juice; and the old ones are dried and used for making mats, baskets, and many other articles, with which they carry on a considerable trade. From the stumps of the branches arise a great number of delicate filaments, of which ropes, and even a coarse cloth, are manufactured.

Indeed, I believe all the palms are very useful, even the humble dwarf fan-palm, which we saw also in this collection, and which Mr. Lumley says is very plentiful in Algarve, the southern province of Portugal; it seldom grows more than three or four feet high, though the stem is thick: its fan-shaped leaves are used for making the baskets in which the dried figs are packed; and its young shoots are eaten as vegetables.

But I was surprised not to see in this collection the silk-thread palm, that celebrated tree which you and I have had the pleasure of seeing in its own country, with its beautiful, long, serrated leaves, composed of innumerable fibres, both finer and stronger than silk, and of which the fishing-nets are sometimes made. How useful it would be if this tree could be induced to grow in England—and how my uncle and aunt would laugh at me if they saw this sentence!

We returned by a different road, and I enjoyed the day very much; the drive was in itself so pleasant, and it is so satisfactory to see anything new with people who have real knowledge like my companions, and who are alive to the pleasure of seeing what is curious. The Miss Lumleys have seen very little, they have seldom been out of the Forest in their lives; yet they are not at all ignorant. They told me that they have not much reading, but that what little knowledge they have has been acquired by the conversation of their father and mother.

Mrs. Lumley is rather silent in company; she seems to have much tenderness, mixed with a firm mind—and though

always cheerful, she looks as if she had suffered a great deal. I imagine they are in confined circumstances, for she said to-day, that, till the morning they came here, she had not been, for many years, in a carriage.

WEEK 10.

On St. Paul's Epistles—Bertha's Discovery—Vineyards of Portugal—Camels in Italy—Mrs. Lumley's Hymn—Arithmetical Questions—Franklin's Farm—Auvergne.

Oct. 9th.—Sunday. After breakfast this morning my uncle conversed a little with us about the Epistles of St. Paul, which I had been saying were very difficult to understand: he remarked, 'that if we attended to the long parentheses that St. Paul makes, and in which his energy and warmth sometimes seem to carry him away, we might easily connect the chain of his argument. But,' said he, 'there are other causes of occasional obscurity. One is the nature of epistolary composition, leading the writer to refer to personal and local circumstances, and particularly to conversations, which were well known to those whom he addressed, and therefore not needing explanation to them. Another arises from the many allusions to peculiar laws and customs that were familiar to his readers, but requiring much research to comprehend them now. There is a third, and a very important circumstance, which is a source of frequent perplexity to commentators, and which, in some degree, affects all the writings of the New Testament, particularly those parts where doctrines are taught rather than facts detailed. Our great philosopher, Locke, alludes to this difficulty: he somewhere observes, that the subjects treated of in the Epistles are so wholly new, and their doctrines so different from the notions that mankind had previously adopted, that many of the most important terms have a different signification from what the same Greek words bear in the heathen authors. Indeed it is obvious that the common Greek language of the day could not furnish accurate expressions for doctrines either entirely new, or derived from the Mosaic law, and the writings of the Jewish prophets. Hence the writers of the New Testament were obliged to employ Greek words, whose meanings were determined rather by analogy, than by their original derivation; and to combine them according to the idioms of the Hebrew and Syriac languages, rather than by the natural construction of Grecian phraseology.

‘It is remarkable,’ he continued, ‘that this circumstance is one which some rash infidels have presumed to consider as inconsistent with the idea of a divine interference in the promulgation of Christianity; and yet, on sober inquiry, it will be found materially to strengthen its evidence. For if no phrase had been used which was not in conformity to the purity of the Grecian tongue, we should lose one of the great marks of authenticity in the New Testament—its peculiar language. You will readily perceive that the Hebraisms and Syriasms by which it is distinguished, and which could have proceeded only from men of Hebrew origin, prove it to have been a production of the first century; for after the death of the first Jewish converts to Christianity we find hardly any instance of Jews becoming preachers of the Gospel; and as to the Christian fathers, they were mostly ignorant of Hebrew. This distinguishing mark is to be found in all the books of the New Testament, in different degrees; nor have these idioms the appearance of art or design, being exactly such as might be expected from persons who used a language spoken, indeed, where they lived, but not the dialect of their country.

‘Obscurity, from this cause, more particularly applies to St. Paul’s Epistles, because they were designed principally for the Jews. St. Paul indeed was born at Tarsus, and his native language was therefore Greek; but having been a very zealous Jew, it was natural that his language should be tinged by Hebraisms; and it is probable that had he studied to avoid the air of a Celician Jew, in speaking or writing, his language would not have been so well adapted to his purpose, and would have made far less impression on the multitude.’

11th.—I have made such a discovery! I long to tell you, Mamma, though I dare say you have already guessed it. I have discovered that Mr. Lumley is the very person whom my uncle met at the harvest-home, and whose history I wrote to you. But I never heard my uncle speak of him by any other name than Fitzroy, which I now find is one of his Christian names.

This evening we happened to be speaking of accomplishments, and Miss Lumley said that she had none to boast of.—‘I believe you know,’ said she, ‘that since we left Strath Morton—a place I shall never forget, though I was then very young—we have been obliged to employ

ourselves in what was useful only; and, until very lately, to assist mamma even in the menial work of the house. I do not feel ashamed to mention this,' she added; 'for it is really gratifying to think and speak of all that my dear mamma was able to do; I only wish you could have witnessed the cheerfulness that accompanied all her exertions.'

She described their little cottage as it was at first, and their way of living;—'We were anxious to save mamma from some of the drudgery there must be, even in the smallest family; and, though often against her will, my sister and I shared, as much as children could, in her laborious occupations.'

'She and my father gave us the best of all knowledge, that of religion—they taught us to feel well the weakness of our nature, and to look up with trust to that Power who gives assistance to the humble. Their leisure was devoted to giving us solid instruction, to the cultivation of our minds, and even to directing our taste to literature.'

'If sometimes we amused ourselves with a pencil, or tried to sing one of mamma's songs, she was delighted to encourage and assist us—and instead of lamenting that we could not do more, it raised her spirits to see even our childish attempts. Indeed, she has often said that the delight of seeing us gay, open-hearted, and good was all she wanted; and when we danced merrily to our own singing, or made a scratchy drawing of a tree, she used to reward us with one of her sweet encouraging smiles, and would say, "Perseverance will do much; and as music and drawing are useful accomplishments, when kept in their right places, your attempts give me pleasure; but I value your cheerful dispositions and grateful hearts still more."

'And indeed mamma was right, for never were there happier creatures than we have been, though enjoying but few of what are called comforts. Our gardens, our forest plays, and the pains we took in watching the habits of birds and insects, were our never-failing amusements; and we desired no more, if we were but sure that papa and mamma were pleased with us. To the constant visits of Mr. Benson, our good old clergyman, we owe much of what we know; he speaks to us so kindly, and he often reads with us, and removes our difficulties by his clear explanations. He has always approved of our acquaintance with the creeping and

flying inhabitants of the forests, for he says natural history is not only a most entertaining occupation, but well suited to a religious mind.'

12th.—My aunt, in the course of the last week, frequently turned the conversation on Mr. Lumley's travels; and he told us many interesting things that he had seen both in Italy and Portugal. First about the vine. In one of the Minho valleys, not far from Oporto, the fields are small, and surrounded by high oaks, chesnuts, and poplars; the ground is artificially watered, and every tree supports a vine, which mounts to the top, and hangs its clusters to the highest branches. In other places, the vines are supported on rough trellises, so as to form shady, arched walks in summer. But neither of those methods is supposed to produce so good fruit as when the vines are kept low; and as these are planted in straight rows, corn and other vegetables are sown between them. They are pruned down every year into the shape of a bush; and a short time before and after they come into blossom, all superfluous branches are removed, and some of the leaves are afterwards taken off to expose the fruit to the sun. The ground is hoed before the leaves come out in spring, and again before the flower comes. Rising grounds are usually preferred for vine culture, and when they are very steep, the earth is supported by dry walls, so as to convert the face of the hill into a succession of narrow terraces, which prevent the heavy rains from washing away the soil from the roots.

He then told us that when figs are gathered in that country, they are thrown into a heap, in a building prepared for the purpose, and that a syrup flows from them which is used for making brandy. They are then spread to dry in the sun, and after some days are pressed into small baskets, made of the dwarf fan-palm, each basket containing twenty-eight pounds weight.

The carob tree is one of the most beautiful of European trees, according to Mr. Lumley's account; it attains a considerable height, and has a wide shady top, with a graceful evergreen foliage of small glossy leaves. The wood is hard and red, and very useful; and the large pods of seed, when dry, make excellent fodder for cattle: this tree is also called St. John's bread.

But what made the greatest impression on me was description of a forest of date-palms, near the town of El

in Valencia. The fruit hanging on all sides, in large clusters of an orange colour, and the men swinging on ropes to gather them, formed, he says, a very striking scene. The trees were old and lofty; and their number was said to exceed two hundred thousand. Many of them had their branches bound up to a point, and covered with mats, by which process they became white; they are then cut off and sent by ship-loads from Alicant, to various parts of Italy, for the grand processions on Palm Sunday.

Mr. L. says, that the little chick pea forms a considerable part of the food of the poor in Portugal; and even common lupines, when soaked in running water to destroy their bitterness, are boiled, and sold in the market-place, and the people eat them out of their pockets. They are also used by the poor in Italy, but generally along with chesnuts, which are bruised and made into a sort of cake.

In ascending the Apennines, Mr. Lumley came to a mountain village of very singular appearance; it gave him more the idea of a collection of huts in some savage country; no streets, no gardens, no appearance of cultivation, except a few great chesnut trees, that united their branches over the miserable houses. The people have large flocks of goats and sheep, whose milk supplies them with cheese, and whose wool is spun by the women in winter, and manufactured into a kind of stuff.

Most of the inhabitants of the Apennines depend on chesnuts, pigeons, bees, and milk, for their food; and, like the natives of Auvergne, they make all their own furniture and clothes. They earn, however, a good deal by going every year to work, for the harvest season, in Lombardy and Tuscany, and the money they gain there they bring carefully home.

The summer pastures for the cattle of the rich plains of Tuscany extend along the brow of the lower chain of the Apennine mountains, where there are a few huts to shelter the wandering shepherds. Those plains, he says, are scarcely habitable in hot weather, from the pestilential effects of the *malaria*, which produces agues and fevers, and which probably arises from the exhalations of the low stagnant marshes. He also saw a vast number of goats; one flock consisted of twelve hundred, and though apparently very wild, they come regularly to their shepherds twice a-day to be milked, and are always rewarded with a little salt.

He afterwards visited the vale of Arno, and travelled along the right bank of that river, at the foot of the Apennines. He describes the forests of chesnut trees, which appeared on the higher slopes of the mountains, with their fresh and beautiful verdure, as forming a singular contrast with the pale blue tint of the olive trees, which cover the lower hills. The road was bordered on each side by pretty brick houses, consisting of a single story, and separated from the road by a walled terrace, on which are commonly placed stone vases, containing flowers, or orange-trees, or aloes; and the house itself completely covered with vines. At the doors, or seated on shady benches, were groups of young female peasants, nicely dressed in white linen, with silk bodices, and straw hats ornamented with flowers. They are constantly employed in plaiting straw for the fine Florence or Leghorn hats; and they earn a great deal of money, which they are permitted to lay by for their dower; but out of this they pay a certain allowance to poor women, who do their share of the farm work. He was assured that a crop of two acres would supply straw sufficient for the whole manufacture of hats in Tuscany. It is the stalk of beardless wheat, cut before it is quite ripe; and the poverty of the soil, which is never manured, keeps it white.

Between Pisa and the sea, he passed through a forest of ilex. The leaves of all these trees were bitten off at the same height—just twelve feet from the ground; and, on inquiry, he found that they had been eaten by camels. He soon after saw two hundred of these animals lying on the sand, waiting to return into the wood as the day became hotter. He was much amused by a group who rose up as he approached, and who, in trotting off with their young, bounded and leaped about with a vivacity which scarcely seemed to belong to their awkward-looking figure. It is said, that this Asiatic race of camels was brought into Italy at the time of the Crusades, by the Grand Prior of Pisa. Mr. L. says they do most of the farm labour.

On this plain he saw also a herd of nearly two thousand cattle. The cows are so wild and fierce, that it is impossible to milk them; and they are killed by the torreadors, with short lances, after a sort of hunt, which affords great diversion to the country people. These Tartar habits, he says are very opposite to those of the vale of Arno, where every thing has been brought to the extreme of art and civilization.

I have been so much interested in all these circumstances, that I have sat up very late to write them for you; and though I have not got through half of them, I will now go to bed like a good girl. I must add, that the shepherds, in the neighbourhood of Rome, who resemble Tartars, with their long pikes, and wrapped in mantles, come every evening with their flocks to seek an asylum within the walls of the city; as they dare not sleep exposed to the noxious air of the adjoining country, where there are no cottages, and where the water even is infected. They take possession of houses and palaces which have been abandoned by the inhabitants, who have been driven into the interior of the city by the *malaria*.

13th.—To-morrow is the last day of the visit of these charming Lumleys. I shall be very sorry to lose them, for I have liked them better every day. The second has the sweetest voice that can be, and joined in some of our glees, which she easily learned. Once or twice they sang all together for us, in the way they do at home; and, among other things, a little hymn, which we discovered was written by Mrs. L. I will copy it for you and Marianne; and, perhaps, some time or other, we three may also sing it together. Oh! when will that time come?

MRS. LUMLEY'S HYMN.

Teach me, O God! to Thee my voice to raise
In meek submission, and in humble praise;
In all events, thy gracious will to see,
In all misfortunes, to behold but Thee.

To feel, in want and anguish, all thy love,
The tender father's discipline to own;
To know that sorrow comes my heart to prove,
To feel the warning of thy awful frown.

O! make me grateful, that I'm timely tried,
And forced from earthly cares to love Thee, Lord!
That, by thy chastisement, thus purified,
I live in Thee, and in Thy holy word.

As lightning clears the sky, by clouds o'ercast,
So shall adversity my heart revive;
When worldly joy is gone, and sorrow past,
My humbled heart in faith and hope shall live.

The sun behind our western hills declines,
 But gilds the evening clouds with golden ray:
 Thus, when the morn of life no longer shines,
 Still Christian hope illumines our fading day
 And as the rising sun dispels the night,
 So shall we wake with joy in Gospel light.

Even now that I know their history, it is difficult to perceive in their appearance and manners that they have lived in such complete retirement; for they always express themselves in good language; and, though timid, they are not in the least awkward. Whatever they do, they do well. They are excellent arithmeticians, and answered some puzzling questions of my uncle's with a facility that surprised him. The power of calculating in the head he thinks highly useful; and, on this occasion, he encouraged me to try with the rest, by showing me how to seize upon the leading points of a question. At first I made no attempt, but spent the time that others were at work, in thinking that I had no chance of success. Having at last, however, recovered from this silly fit, I exerted myself, and actually gave the first answers to the three following questions:—though I will not say that some of the party did not good-naturedly wait a little for me. I send them to Marianne, though I know they will appear trifling to her, for she was always quicker at arithmetic than I was; but tell her, the great thing is, to do them in her head.

How much time, in the course of thirty years, does a person gain, who rises at six o'clock in the morning, over another who sleeps till nine; supposing that the former goes to bed at eleven, and the latter at midnight?

There is a cistern in this house which contains 180 gallons of water: it is supplied by a feeding pipe, which admits 15 gallons in ten minutes; and the tap, or discharging pipe, lets off 12 gallons in six minutes. Now, suppose, when the cistern was exactly half full, that both cocks were opened, and that at the end of an hour afterwards the tap-cock was shut: in what time will the cistern be filled?

Herodotus mentions a brass vessel that was shown in Scythia in his time, which was six digits in thickness, and contained 600 *amphoræ*, or about 4300 gallons. It had been made of arrow points, collected by the king from his subjects, in order to ascertain their number—each in its

dual being obliged to bring one. Such a vessel would be 11 or 12 feet in diameter; and, from the thickness of the metal, must have weighed about 71,000 pounds troy. Now, if each arrow-point was half an ounce, the question is—Of how many fighting men could the Scythian monarch boast? for it is not probable that the women and children were included in that kind of warlike census.

My uncle was pleased at the efforts I made, even when I failed, because it showed that I had conquered my old enemy—indolence.

I wrote down these questions while they were fresh in my mind; and then we all went to take our last walk together to Franklin's farm. We found him and his active wife fixing on the situation of the house and garden, and orchard.

They have chosen a place where there is a pretty slope in the ground, so that the drains will have a good fall from the house. The garden is to be in front, and the orchard at one side. They are going to double-trench the ground, by digging it to twice the depth of the spade. It is to be left in that state during the winter; and the soil being thus exposed to the action of air and frost, will be improved. In the course of the winter they will plant a young hedge round the garden.

This day was one of those lovely, mild, sunny days in October, of which I have often heard you speak;

When Autumn scatters his departing gleams

We stayed out till sunset, enjoying the balmy air, and amusing ourselves capping verses. This we are all very fond of, and all strove hard for victory; but I must confess that Mary was most frequently the conqueror.

14th.—It has surprised every body how much knowledge these Miss Lumleys have acquired; and yesterday, when we were out walking, my aunt expressed this surprise to Mrs. Lumley.

'Next to the great principles of religion and morality,' she replied, 'we endeavoured from their infancy to give them habits of *exactness*, which we have always found lead not only to regularity and economy of time, but become great preservatives of truth. On such a foundation it was not difficult to ingraft the love of knowledge; and literature was always made an indulgence, not a task. After

affectionately helping me in our many coarse and laborious works, they first sympathized in the pleasure they perceived I felt, when I had time to read a few pages of some interesting history or poem; and, from sympathy, they soon began to taste the pleasure themselves.'

They continued the conversation till dinner-time, and both seemed equally pleased at finding how exactly they agreed in their sentiments on education. In the evening, after some music, my aunt, who had been particularly gratified with the piety that appeared in everything that had dropped from Mrs. Lumley, but who knew that very good people sometimes differed in opinion on trifling matters, said to her, 'I should be inclined to play some lively tunes, and set our young people to dance; but I am not sure whether you approve of dancing, and in such a slight thing I would not offend opinions that I am sure deserve respect.'

'Indeed,' she replied, 'I feel, just as you do, great pleasure in seeing young people cheerful, and enjoying amusements suited to their age; nor can I find, in any part of that Book which should be our guide, one word to indicate the impropriety of social amusement—if moderately indulged in, and not made the business of life. Moderation, in all things, I do indeed enjoin. My daughters, I fear, can ill take a part with yours—but I shall be delighted to see my good, homely girls amused. I must add,' continued she, 'that I should be sorry you mistook my opinions; misfortune has made me think seriously, but not harshly. It has given me deeper views of religion than I had in the careless hours of prosperity; but, at the same time, it has convinced me how much more there is of affected singularity than of real religion in prohibiting a moderate degree of amusement. It is very probable that I might have become enthusiastic or melancholy, had it not been for the friendship of Mr. Benson, that good clergyman who lives near us. It is not too much to say, that, in his conduct, as well as in his sentiments, he shows the happiest union of Christian piety with all the social virtues; and that his profound learning, on the most important of all subjects, is embellished by the graces and knowledge of this world.'

My aunt then sat down to the piano-forte, and summoned us all to dance. Mr. L. and my uncle were so good as to join our party, and we danced very merrily for about an hour; and so ends our last night with these very engaging Lumleys.

15th.—Mr. Lumley said the other day, that the inhabitants of the Apennines were like the people of Auvergne in their manners; so I took an opportunity this morning of asking my aunt some questions about them. She told me, that Auvergne has been very little known till lately; even the remarkable fact, that the whole district is a collection of extinct volcanoes, has not been very long discovered. It has been visited by few travellers, and the people seem to have had but little intercourse with their neighbours. Bakewell's Travels were in the room, and she gave me the following passages to read.

‘It was market-day, and we met a long train of carts with wood, each drawn by four oxen, coming to Clermont. The dress and appearance of the mountaineers who were conducting the carts were very striking; with immense broad-brimmed hats, long, lank hair, gaunt features, and striped cloth cloaks, that reached nearly to their feet, they bore no resemblance to Frenchmen, and they spoke a different language. I believe they are the descendants from the same race who resisted Cæsar; for whatever changes may have taken place in other parts of France, none of the warlike hordes who ravaged the more fertile parts of the country in succeeding ages, would have wished to take possession of the sterile mountains of Auvergne, or to undertake the task of driving out the original inhabitants. I was much surprised, on entering some of the houses, to observe that the lamps, water-pots, and other earthenware vessels, were of the same form as the Etruscan vessels from Herculaneum; they are doubtless made after models transmitted from very remote antiquity, as vessels of these forms are not found in any other parts of France that I have visited. The music of the Auvergnats is the bagpipe.

‘Many of the families in the lower or middle rank of life have small vineyards, and make wine for their own use. A freehold vineyard, which cost two hundred francs, or about eight pounds sterling, produced wine more than sufficient for a family of five persons, as we were informed by one of these little proprietors. They cultivate the vineyards themselves; and seem to live in contented and obscure independence, relying on their own industry for everything, and preserving the customs of their remote ancestors.’

WEEK 11.

Transgression of our First Parents—Plagues of Egypt—Laplanders—Reindeer—Fata Morgana—Arabian Tales—Old Quarry—Plan of Bertha's Garden—Lobelia in wet ground.

Oct. 16th.—Sunday. The history of our first parents, and the nature of their transgression, was the subject of our conversation this morning. Towards the end of it, my uncle said, 'It is a strange error, though some sensible people seem to have fallen into it, to doubt the truth of this early part of sacred history, because the eating of a certain fruit was apparently too trifling to be considered a trial of obedience. But there is one circumstance which they do not seem to have sufficiently considered; that, if it was necessary to lay Adam under some small restraint, to remind him that, notwithstanding his dominion over all things, he was still the servant of the Most High, a trial of his obedience to any *moral* precepts could scarcely have been made, for there was no opportunity at that time of violating them. For instance, there was nothing to tempt him to idolatry, when every recent circumstance must have carried with it a conviction of the single power of the Almighty; and when the impression of the Creator's beneficent agency was kept alive by the frequent visits of his glorious presence. Highly-favoured creatures.—the voice of their God was a sound familiar to their ears!

'As there were no other inhabitants in the world, it was impossible to steal, murder, covet, or commit any crime against society. It had been, therefore, vain indeed, to forbid that which could not be done. There could be no virtue in abstaining from crimes to which there was no temptation: but there would have been virtue in submitting to the commands of God, who required only this simple abstinence in token of their subjection; and no matter how small the trial, it was their part to have obeyed. It pleases God to try our virtue some very small temptations, and the weakness with which we are afflicted in the least things, may convince us that we are not capable of resisting great temptations. progress in

'Insignificant creatures that we are, and limited perceptions, we are always under the decrees of the Supreme Disposer of all things are not otherwise. I have read

by Philo, a learned Jew, which may apply to this presumptuous disposition of mankind. In treating of the plagues of Egypt, he says, "Some inquire why God punished the country by such minute and contemptible animals as flies and frogs, rather than by lions, leopards, or other savage beasts that prey on man. But let them reflect that God chose rather to correct, than to destroy the inhabitants—if he had desired to annihilate them utterly, he had no need to have made use of any auxiliaries. Let them remember, also, that when God—the source of all power—who stands in need of no assistance, chooses to employ instruments, as it were, to inflict chastisement; instead of the strongest, he selects the mean and the despicable—but which, in his service, are endowed with irresistible force."

17th.—As my uncle saw how much I was interested about the Laplanders, and their reindeer, he was so good as to read to us, last night, an account of them, from De Capell Brooke's travels, a very entertaining book, which has been lately published. I will transcribe a little of it here, as I know Marianne will like to see it.

' My landlord having received intelligence that the Laplanders, with their reindeer, were within a mile of Fugleness, I was anxious to avail myself of the opportunity of seeing them. After an hour's walk, we found the tent and its owner, Per Mathison; and inside the tent, into which we crept, Marit, his wife, was busy preparing the utensils for milking the deer and making the cheese. She was not more than four feet nine inches high, and of a brown complexion, which seemed more the result of habitual dirt, and of living constantly in smoke, than of nature. She had on her summer dress of dirty white cloth, girt round by a belt, to which was suspended a small knife; and her *komagers*, or shoes, were of strong leather, forming a peak at the toes. On her head she wore a high cap, made partly of cloth, and partly of bits of coloured calico. This cap is peculiar to the Norwegian Laplander, and is rather elegant in its shape. Though wild and uncouth, her manners did not betray the surliness so conspicuous in her husband. The latter was dressed in reindeer fawn skins, which, being thin and pliable, were not likely to be too warm.

' Another Laplander and his wife lived in the same tent. This man seemed to be a partner of Per Mathison; their deer were mixed together, but the superior number belonged

to the latter, and he was evidently head of the family, which was easily perceived, from his idleness and inactivity, mixed with a kind of gruff independence, that bespoke a laird of the mountains. He had, for the last two summers, brought his herd of deer to the mountains of Whale Island, from the interior of Norwegian Lapland—a distance of more than two hundred miles. Here he remained between two and three months; and before the approach of winter again returned to his native forests.

‘ In about two hours, the distant barking of the dogs indicated the coming of the deer, which we at last discerned winding slowly along the mountains at the distance of near a mile, appearing like a black moving mass. They now approached the fold, which was a large space that had been cleared of the brushwood, and inclosed by branches of dwarf birch and aspen, stuck round to prevent the deer from straying. As the herd came up to it, the deer made frequent snortings; and a loud crackling was heard, produced by their divided hoofs striking against each other. These animals, being endued with an exquisite sense of smelling, soon perceived there were strangers near; and our appearance, so different from the dress of the Laplanders to which they had been accustomed, alarmed them to such a degree, that it was necessary for us to retire till they had entered the fold. After some difficulty, the whole herd were at length collected within the circle; and the women, bringing their bowls from the tent, began the operation of milking, which, as some hundreds of deer were assembled, was likely to take up a considerable time. In this both the men and women were busily employed. Before each deer was milked, a cord with a noose was thrown round the horns, by which it was secured and kept steady. The Laplanders are extremely expert at this; and it was surprising to see the exactness with which the noose was thrown from a distance; hardly ever failing to light upon the horns of the deer for which it was intended, though in the thickest of the herd. The cord for this purpose was made of the fibres of the birch, very neatly plaited together, and exceedingly strong. During the short time the animal was milking, this cord was either held by one of the women, or made fast to a birch shrub; some of the thickest having been stripped of their leaves, and left standing for this purpose. Many of the deer, instead of being tractable, as I had

imagined, were very refractory, frequently even throwing the women down, and hurting them with their horns. They seemed very little to mind this; but, strong as the Laplanders are, they appeared to have little power over these animals, for when one had the cord round its horns, and refused to be milked, it dragged the holder with ease round the fold. The quantity of milk that each deer gave scarcely exceeded a tea-cup full; but it was extremely luscious, of a fine aromatic flavour, and richer than cream. Of this we eagerly partook, after we had permission; which, however, Per Mathison did not, at first, seem willing to grant, but his sullen nature was soon softened by brandy.

‘ In the middle of the herd of deer, suspended to the branches of a low birch, was a child about a year old, enclosed in a kind of cradle, or case, covered with leather. The Laplanders, when obliged to go any distance from their tents, frequently leave their children thus suspended on a tree, by which they are secured from the attack of any ravenous animal.

‘ It was past midnight before the whole of the herd was milked. The sun had left the heavens about an hour, but a deep orange tint, on the verge of the horizon, showed that it was not far below it. The deer were at length turned out from the fold, and, spreading themselves along the sides of the mountains, were quickly lost to our view. The Laplanders now collecting the milk, which amounted to a considerable quantity, proceeded with it to the tent, inviting us to supper. We crept in, and seated ourselves on reindeer skins, which were strewed on the ground. The business of making cheese now commenced; and Marit, emptying the milk from the bowls into a large iron pot, placed it over a fire, in the centre of the tent, the smoke of which annoyed us much. In a short time, the milk assumed the appearance of curd, and, being taken off, was placed in small moulds, made of beech-wood, and pressed together. The number of cheeses thus made amounted to about eight, of the size of a common plate, and barely an inch in thickness. The whey and curds that remained were for our supper, though the dirty habits of the people much diminished my appetite.

‘ After supper was finished, and the bowls and other utensils removed to a corner of the tent, fresh wood was placed on the fire, which again enveloped us in smoke.

On its burning up, the flames reached the cheeses, which had been placed on a board directly over the fire, that the smoke might harden them. Their richness, and the heat, caused large drops of oil to trickle from them, which the men licked up with evident relish.

'The whole group was a curious one. Opposite to us, around the fire, were the uncouth figures of the Laplanders, squatting on their haunches. In one corner were two children asleep in deer-skins; and more than twenty small dogs were also reposing about us. It was soon time for the men to commence their nightly employment of watching the deer, and accordingly one of them left the tent. On making a signal, about half the dogs, whose turn it was to commence the watch, started suddenly up, and followed their master to the mountains. I was greatly surprised to find the rest take no notice of the summons, and remain quietly stretched on their deer-skins, well aware, singular as it may seem, that it was not their turn.'

18th.—Mary is reading Waddington's Visit to Ethiopia and Dongola, and she showed me an account in it of the *mirage*, that most curious deception of the sight.

In crossing the immense sandy plain near Askán, in Dongola, Mr. W. says they had a good view of the mirage. It assumed, at first, the appearance of a broad winding stream, which he mistook for the Nile. It then changed rather suddenly from a river to a sea, covering the whole of the horizon in front of the party; while castles, trees, and rocks seemed to stand in the middle of the water, in which those objects were most distinctly reflected. The apparent distance of the nearest part was continually changing from one quarter to three-quarters of a mile.

At Bakkil Mr. W. saw another beautiful mirage; and he remarks that the two or three places where he had seen this phenomenon in the greatest perfection were peculiarly frequented by the antelope, as if she loved the banks of that fairy sea, and delighted to gaze upon its fugitive waters. It is a singular coincidence with this observation, that the mirage is called by the Arabs of the Desert,—the lake of the gazelles.

I was anxious to learn something further on this curious subject, and not knowing what books to consult, I applied to my uncle. He tells me that a species of mirage is very common at sea; distant ships seem grotesquely caricature

by it, either in length or in height ; and sometimes, over the real vessel, an inverted picture of it appears suspended in the sky, with the masts of each prolonged so as to unite. A similar effect was observed in the desert by the French, in their Egyptian expedition ; the villages appearing distorted, or raised above their natural level, or as if built on an island in the middle of a lake. As they approached, the apparent surface of the water became narrower and narrower, till it disappeared ; and the same deceptive appearance began again at the next village. But all travellers through sandy plains, in hot climates, mention this kind of optical deception, and particularly that of its having the appearance of water. Some of them, after having travelled for hours in a burning desert, faint and exhausted, have had their spirits revived by the sight of water, and have eagerly pushed on to refresh themselves and their poor camels : you may judge of their disappointment when they perceived that it was all illusion.

Another very remarkable instance of mirage, my uncle says, has been more than once seen at Reggio, in the straits of Messina, where it is called the Fata Morgana. When the rays of the sun form an angle of about 45° with the sea, and the bright surface of the water in the bay is not disturbed by wind or current, if the spectator be placed with his back to the sun, there suddenly appears on the water the most incomprehensible variety of objects—pilasters, arches, and castles, lofty towers and extensive palaces, with all their balconies and windows—or perhaps trees, valleys, and plains, with their herds and flocks—armies of men, on foot and on horseback, and many other strange objects ; all in their natural colours, and all in action, passing rapidly in succession along the surface of sea. But if, besides the circumstances before described, the atmosphere happens to be loaded with a dense vapour, which the sun had not previously dispersed, the observer will behold a representation of the same objects in the air, as if traced there on a curtain ; though not so distinct or well defined as those on the sea. These curious appearances were fancifully called, by the Italians, the castles of the Fairy Morgana

My uncle says that the celebrated Dr. Wollaston has proved, by some very ingenious experiments, that they arise from the irregular refraction of the rays of light, in passing

through contiguous portions of air, of different densities. One of these experiments he was so good as to show us; and as it is so simple, that Marianne can easily try it, I will endeavour to describe it here.

He put a little clear syrup into a square phial, and then poured about an equal quantity of water into it, over the syrup. The phial was set on the table, and having placed a printed card about an inch behind it, he made us observe that when we looked through the syrup, or through the water, the letters on the card appeared *erect*; but that when they were seen through that part where the two fluids were gradually mixing together the letters were equally distinct, but *inverted*. A similar effect, he said, may be produced with hot and cold water, or even by two portions of cold and heated air; and to show us this, he performed another very easy experiment. He placed two of the library chairs back to back, and about a foot apart; he connected the tops of the chairs with two bits of strong wire, and on the wires he laid the kitchen poker, the square end of which he had made red hot. Exactly in the direction of the poker he pinned a large printed A upon the wall, which was about ten feet distant; and then desired us to look at it along the heated poker. We did so, and we all distinctly saw three images of the A, the middle one being inverted, and the two others erect.

Dear Mamma, how this reminded me of the day when you first explained to us the meaning of *refraction*, and showed us the pretty little experiment of the stick, which appeared to bend just at the surface of the water. How often I now feel the benefit of all your patient instruction, and how often I wish I had your excellent memory, which enabled you to teach us so many things, without having any books to assist you!

20th.—My cousins like Eastern tales just as much I do—and my uncle speaks of the Arabian Nights' Entertainments as if he was still a boy. He thinks that they are not only very ingenious, but that many of the apparent wonders which are related as supernatural, may be easily explained by means of the chemical and philosophical knowledge of the gazelle. I was too generally supposed to be the result of late dissection, subject, . . . I should like to read over all my favourite tale to my uncle, for the benefit of his explanations. What brought common at my mind now was a pretty little anecdote which

I once heard him tell Grace, and which she has just been repeating to me.

In Khorasân, there was a certain old caravanserai called Zafferounee, which was once so very extensive, as to contain seventeen hundred chambers, besides baths and shops, and, besides, accommodation for thousands of cattle within its walls. It is said to have been erected by one of those wealthy Eastern merchants, who delighted in perpetuating their names by acts of public utility. While it was building, and a large quantity of straw and clay were mixing up for that purpose on the road near it, a cafilah, consisting of a hundred camels, loaded with saffron, chanced to pass; and one of them slipping into the clay, fell, and was disabled. Their owner inveighed bitterly against those who, by so carelessly doing their work on the public road, had occasioned such a serious loss to him. The merchant, who was himself superintending the progress of the building, on hearing these complaints, inquired what might be the value, not only of the camel which had been disabled, but of all the rest; and purchasing the whole on the spot, ordered the saffron to be tumbled into the clay, and worked up with it, instead of chopped straw. It was from this that the caravanserai obtained the name of Zafferounee, or Saffron.

This rich merchant, however, fell afterwards into difficulties, as might have been expected from his extravagance, and at last became a beggar. Travelling in search of subsistence into foreign countries, he happened to visit the place where the camel-driver, now grown immensely rich, lived in splendour. It came to the ears of the latter that a stranger, in poverty, who spoke of his former riches in Khorasân, was living wretchedly in the town; and suspecting that this might be his old benefactor, he invited him to his house, and, after feasting him superbly, induced him to relate his history: when, in concluding it, the unhappy Khorasânee described his destitute condition, the other interrupted him, saying, 'How can you call yourself poor, when you are, in reality, a man possessed of great riches?' 'Ah! no;' replied the other,—'once, indeed, I had much wealth; but all is gone; and I am now a beggar!' On this, his host carried him to a secret chamber, which was full of money—'This,' said he, 'is all yours; it is the price of the saffron which you so liberally purchased from me. I have traded upon it, and become rich; but the original

sum I have always reserved as belonging to you ; take it now, and live happily.'

Grace is always encouraged to repeat to others the little stories which are told to her : I wish you could have heard her relating this to us before tea.

22nd.—Well, I am in actual possession of the old quarry. Having settled all my plans, I at once set to work, and my uncle was so good as to let me have one of the workmen to help me, because he said my ideas were rational. The opening of the quarry fronts the south-west ; the rock at the back is high and steep, and a spring which trickles from it keeps the part which had been most deeply worked constantly full of water. In this I have put several pretty water-plants—Mr. Biggs, I know, lays a quantity of peat compost in his pond ; but though I have not been able to obtain that yet, I have planted the white and the yellow water-lily, which the gardener found for me a few miles off. A thick skreen of shrubs has been planted, by my uncle's directions, above the rocks to the north, but no forest trees, for in a short time they would outgrow the place which they ornament only while young.

The middle and southern parts of the quarry are to be sloped and dressed ; all the briars have been already taken out, and the loose splinters of the quarry are spread on the surface of the bank. Upon these the gardener has laid a mixture of peat earth and sand, which he had to spare ; and here I intend to have an incomparable bed of strawberries.

South of these, and where the rocky bank sinks, I am filling up the hollow and uneven spots with the same mixture and rotten leaves ; for Mr. Biggs says that the natural soil of the beautiful North American shrubs is chiefly formed of decayed vegetables.

Groups of *rhododendron*, *azalea*, *kalmia*, and many more, which, as I have learnt from that delightful book, Miller's Dictionary, are suited to that soil and aspect, are to flourish there ; and, by Mary's advice, they are to be mixed with some of the Scotch roses. These are rather scarce here but Mr. Biggs has been so generous as to send me a small piece of the root of each of his own rose-bushes. There are a few fibres on them, and he assures me they will sprout in spring—so it will be a good experiment at least. I shall also have a little grass-plot, with a few small beds for choic

flowers, which I expect will blossom very early in this little snug spot.

I have planted some of the *lobelia fulgens*, and a *hydrangea*, which is a native of marshy ground, near the edge of the pond—and when spring comes I hope to execute many other grand plans, which I have formed from hearing Mr. Biggs. My cousins approve of them, and all help me, and Mary wonders she never thought of adorning the old quarry before.

I am now very busy in making a bed for *ixia*, *gladiolis*, *lachenalia*, and *oxalis*—they are usually in a greenhouse, but I hear that, if planted late in October in a soil composed of peat earth and sharp sand, and over this, if a layer of peat, eight inches thick, be laid, to prevent the frost from reaching them, they will be in beautiful blossom in spring. I will try this—my uncle encourages experiment; he says, it is the high road to truth—and he assists all who wish to travel on it.

WEEK 12.

Noah's Prediction—Descendants of Shem—Progress of the Gospel—Optical Deceptions—Drains—Springs—Swamps—Orchard—Flax Crop.

Oct. 23rd.—Sunday. I asked my uncle, this morning, to tell me the meaning of Noah's prediction, 'God shall enlarge Japhet, and he shall dwell in the tents of Shem.' In reply, he told us the opinions of a very learned person, for whose writings he has a high respect; and I will endeavour to give you the substance of what he said.

'The most obvious meaning of the expression is, that Providence would bless Japhet with a numerous progeny, which should not only spread over an ample tract of country, but that they would afterwards encroach on the territory of Shem's descendants. And this sense of the words is supported by history; for the whole of Europe, and a considerable part of Asia, was originally peopled, and has been always occupied by Japhet's offspring, who, not contented with their own possessions, have repeatedly made encroachments on the sons of Shem: as, for instance, when Alexander the Great, with an European army, attacked and overthrew the Persian monarchy; when the Romans subjected a great part of the East; and still more when the

Tartar conquerors of the race of Genghis Khan destroyed the empire of the Caliphs, took possession of their country, and made settlements in all parts of Asia. Tamerlane also led his Moguls, who were another branch of Japhet's progeny, into Hindostan; and their descendants gradually obtained possession of that immense country, a part of Shem's original inheritance. These events, and others of the same nature, may be considered as the accomplishment of that prophecy; not only because they answer to the natural import of its terms, but because they have had great influence on the state of true religion in various parts of the world: so that in this interpretation we find the two circumstances which are the characteristics of a true interpretation,—an agreement with the facts recorded in history, and a connexion of the particular prediction with the general system of the prophetic word.

'It would seem, however, that some amicable intercourse between parts of those two great families is implied by the expression, "Japhet's dwelling in the tents of Shem;" for the settlements made by the Portuguese, English, Dutch, and French, in different parts of India, which was a part of Shem's inheritance, may be taken in this sense. And consequences cannot but arise of great importance, from such numerous and extensive settlements of Christians, in countries where the light of the Gospel has been for ages extinguished.

'There is still a third sense; but in order to make it more apparent, it will be proper to consider the precise meaning of Shem's blessing—a blessing obliquely conveyed in this emphatic ejaculation, "Blessed be Jehovah, the God of Shem!" This evidently implied that Jehovah was to be more peculiarly the God of Shem; and in the same sense that he afterwards vouchsafed to call himself the God of one branch of Shem's progeny—of Abraham, Isaac, and of Jacob, and of their descendants, the Jewish people. Although the universal Father of all the nations of the earth, he may be said to have more particularly adopted the descendants of Shem, in choosing them to be the depositaries of the true religion, while the rest of mankind were sunk in idolatry and ignorance. Among them he preserved the knowledge and worship of himself, by a series of miraculous dispensations; to them he confided the representative priesthood, the type of the Messiah; and when tl

destined season came, he raised the Messiah himself from among the offspring of that chosen family.

‘But the expression, “the tents (or tabernacles) of Shem,” alludes to the Jewish tabernacle, which was one of the external means of preserving the worship of the true God. The word in Hebrew is the same for both tent and tabernacle. This holy tent was Shem’s tabernacle, because it was intrusted to his descendants, and because none but them might bear a part in its sacred service. Now this tabernacle, and this service, were undoubtedly emblems of the Christian church and Christian worship. It appears, then, that in the mention of the tents of Shem, Noah was inspired to make allusion to the Jewish tabernacle, as the symbol of the Christian dispensation; and that the dwelling of Japhet in those tents of Shem took place when the idolatrous nations of Japhet’s line became converted to the faith of Christ, and worshipped the God of Shem in Shem’s tabernacles; that is, worshipped God in the truth and spirit of revealed religion.

‘This prediction, therefore, bears directly upon the general object of all the prophecies—the union of all nations in the faith of Christ. And the fact is notorious, that the Gospel has, from the beginning to the present time, made the greatest progress in Europe, where the early and wide-spreading conversions of the idolaters of Japhet’s line (among whom were our ancestors) soon led to encroachments on the territory of Shem.

‘How grateful should we be,’ my uncle added, ‘to those learned men who thus elucidate the difficult passages in Scripture, and show the beautiful harmony of the whole prophetic system!’

24th.—I am reading ‘Bartram’s Travels in North America.’ It is not a late publication, but very interesting to me, as I like to compare the productions of North and South America.

Among all the beautiful trees of our Southern regions, I do not recollect having seen or heard of the deciduous cypress, the majestic grandeur of which, he says, is surprising. It generally grows in low flat grounds, that are covered, part of the year, with water. The lower part of the stem, which is frequently under water, enlarges into prodigious buttresses; and they project on every side to such a distance, that several men might hide in the recesses be-

tween them. The stem is generally hollow as high as the buttresses reach, where it forms, as it were, another beginning, and rises, in a straight, uninterrupted column to the height of 80 or 90 feet. There it throws out its noble branches like an umbrella; eagles securely build their nests in them; they are the abode of hundreds of parroquets, who delight in shelling the seeds; and even the hollow stem is not untenanted, as it affords spacious apartments for the wild bees.

The trunks supply excellent timber; and, when hollowed out, make large and durable canoes. When the planters fell these mighty trees, they erect a high stage round them, so as to reach above the buttresses; and on these stages eight or ten men can work together with their axes.

Another curious fact which I found in this book is, that the inhabitants of East Florida prepare from the root of the China briar a very agreeable sort of jelly, which they call *conti*. They chop the roots in pieces, which are afterwards pounded in a wooden mortar; and, when washed and strained, the sediment that settles to the bottom dries into a reddish flour. A small quantity of this, mixed with warm water, and sweetened with honey, becomes a delicious jelly when cool: or, mixed with corn flour and fried in fresh bear's oil, it makes very nice cakes.

26th.—I have just found, in 'Bartram's Travels,' some particulars that I do not think we knew before, of that curious species of the *Tillandsia* commonly called long moss.

It grows on all trees in the southern regions of North America; and any part of the living plant, torn off and caught on the branches of another tree, immediately takes root. Wherever it fixes, it spreads into long pendent filaments, which subdivide themselves in an endless manner, waving in the wind like streamers, to the length of twenty feet. It is common to find the spaces between the boughs of large trees entirely occupied by masses of this plant, which, in bulk and weight, would require several men to carry. In some places, cart-loads of it are found lying on the ground, torn off by the violence of the wind. When fresh, cattle and deer eat it in the winter season; and when dry, it is employed for stuffing chairs, saddles, and beds; but to prepare it properly for these purposes, it is thrown into shallow ponds of water, where the outside furry substance soon decays: it is then taken out of the water and

spread in the sun; and, after a little beating, nothing remains but a hard, black, elastic filament, resembling horse-hair.

There is a curious anecdote about the name of this plant, in 'Harry and Lucy concluded;' but I need not mention it here, because my uncle has sent that delightful little book to you, and I am sure Marianne will have run through it with as much eagerness as I did.

28th.—I have just found some more instances of those strange optical deceptions, which seem to be of the same nature as the *Fata Morgana*. My aunt thinks that the term mirage only applies to the deceitful waters of the desert.

Mr. Dalby writes, in the *Philosophical Transactions*, that, ascending a hill in the Isle of Wight, he observed that the top of another hill, of about the same level, seemed to dance up and down as he advanced; and on bringing his eye down to within two feet of the ground, the top of the hill appeared totally detached, or lifted up from the lower part, the sky being seen under it. This he repeatedly observed; and he adds, that as the sun was rather warm for the season, with a heavy dew, there was a great deal of evaporation going on.

Another very singular example of these extraordinary appearances in the atmosphere is given by Dr. Buchan. Walking on the cliff about a mile east of Brighton, in the latter end of November, just as the sun was rising, he saw the face of the cliff on which he was standing represented precisely opposite to him, at some distance in the sea; and both he and his companion perceived their own figures standing on the summit of the apparent cliff, as well as the picture of a windmill near them. This phenomenon lasted about ten minutes, when it seemed to be elevated into the air, and to be gradually dissipated; and he remarks, that the surface of the sea was covered with a dense fog many yards in height, which slowly receded before the sun's rays.

How frequently it happens, when the curiosity has been awakened by any new subject, that chance leads one to some circumstance in books, or conversation, that exactly applies to it! By mere accident, I opened Scoresby's voyage at the following passage, which I have just time to transcribe.

After describing the amusing spectacle of some distant ships, which were either curiously distorted, or inverted in the air, by means of this wonderful kind of refraction, he says, 'When looking through the telescope, the coasts of ice, or rock, had often the appearance of the remains of an ancient city, abounding with the ruins of castles, churches, and monuments, with other large and conspicuous buildings. The hills often appear to be surmounted with turrets, battlements, spires, and pinnacles, while others, subjected to another kind of refraction, seem to be large masses of rock, suspended in the air, at a considerable elevation above the actual terminations of the mountains to which they refer. The whole exhibition is a grand and majestic phantasmagoria: scarcely is the appearance of any object fully examined and determined, before it changes to something else; it is perhaps alternately a castle, a cathedral, or an obelisk,—and then expanding and coalescing with the adjoining mountains, it unites the intermediate valleys, though they may be miles in width, by a bridge of a single arch, of the most magnificent appearance.'

29th.—We have been visiting Franklin's farm to-day, and have had a very pleasant walk, late as it is in the year. He is so diligent, that he has done a great deal to it since we were last there. Between it and the next land he has made a ditch, with a high, firm fence of flat stones placed edgeways, in three rows, each row sloping a little, and all supported by a bank of earth behind them; between the two upper rows of stones he has planted quick-thorns, and on the top of the bank a few young oak and elm trees. The deep ditch will serve to carry off the water from some drains that are to be made in a part of the ground which is wet and marshy. These drains are to be covered with earth; and something must be done to keep them from filling up. Some people line them with stone, but that is too expensive; and as he has just clipped some of his hedges, he intends, I believe, to put the branches of the thorn-bushes into the bottom of the drains, which will also prevent the sides from falling in.

Springs are formed in the bosom of the earth, my uncle says, by the rain water which sinks through the surface, and which, gently oozing, or *percolating*, as he calls it, through the sand or gravel, or through other porous strata, continues to descend till it is intercepted by some bed of

clay or rock. No longer being able to descend, it follows the course of this impassable bed, and if thus conducted to the outside of the ground, lower down the hill, it forms then a spring. But if prevented by any obstacle from flowing freely out of the ground, it diffuses itself under the surface, and produces swamps and marshes. My uncle has been of great use to Franklin, not only by teaching him how to discover from the form of the ground where it is most likely to meet with and *tap* these concealed springs, but by laying out the drains for him with a levelling instrument, so that they should have sufficient fall into the main ditch, or into a little rivulet which skirts his farm. I could not have conceived that science might be made so useful even in common agriculture.

Franklin is also ploughing a field for wheat—and is going afterwards to plough up another field that looks all rough and ugly, but which is to be left unsown the whole winter; he intends to plough it two or three times, and then in Spring, after it has lain fallow in this way, he will sow it with barley. Another grand operation is the preparing a piece of ground for an orchard: my uncle has promised him some nice young fruit-trees for it; and Franklin, very prudently, brought over some American apple-trees, which he says are very productive.

The blind basket-maker sometimes walks to the farm with the assistance of Bessy's arm; and it is impossible to see the happiness of the whole family without feeling the strongest interest in their welfare. She now looks quite blooming and healthy; and she is so industrious, that, besides her in-door occupations, she has persuaded her husband to give her an acre of ground for flax, with which she hopes to do a great deal. This will be a very uncommon crop in this country, but I am sure, from what my uncle says, that it will be very profitable.

WEEK 13.

Character of Joseph—*Earing* explained—Visit of Mr. R.—Tabasheer—Bamboo—Madeleine's History—The Beech Walk—Mosses—Variety of Lichens—The Fieldfare—A Winter's Walk.

Oct. 30th.—Sunday. We had a conversation this morning on the character of Joseph; which my uncle thinks a fine example of all the Christian virtues. 'If we follow him,' said

my uncle, 'from his youth to the height of his preferment, we see him, in every part of his life, virtuous and religious; patient and courageous under misfortune; modest and temperate in the greatest success. He suffered injustice from his master, who imprisoned him, though he had been just and faithful; but under this great trial he had the comfort of knowing that he was innocent. He had the still greater comfort of confiding in the support of God, who, in his own good time, delivered him from prison, and permitted him to be raised to a high situation, where his integrity might be made manifest. Then, if we consider his generous forbearance towards his brethren, how highly does it raise our admiration of his truly amiable disposition! When they were in his power—in just resentment of their former cruelty, he thought it right to mortify and humble them, but no sooner did he see that they were penitent, than his anger ceased. And when he discovered himself to them, with what kindness and magnanimity he endeavoured to make them less dissatisfied with their former conduct!

"Be not grieved nor angry with yourselves that ye sold me hither; for God did send me before you to preserve life: to preserve you a posterity in the earth. So now it was not you that sent me hither, but God."

'Can anything be more touching,' added my uncle, 'than his generous anxiety to make his brethren forgive themselves, by showing the advantages that were ultimately produced by their conduct to him?'

'There is one thing,' said Wentworth, 'that I do not understand—why does Joseph say there shall be neither earing nor harvest, as if he meant two separate things?'

'The word *earing*,' replied my uncle, 'sounds as if it meant gathering ripe ears of corn; but it is an old English term for ploughing, and is used in that sense in two other parts of Scripture.'

'I had imagined,' said Caroline, 'that earing was mentioned in that particular manner, in allusion to some blight, through which the corn should no longer give such an astonishing produce as seven ears to one stalk.'

'No,' said my uncle; 'nor was that an unusual produce. A species of wheat still grows in Egypt, which generally bears this number of ears, and the stem is solid, that full of pith, in order to support so great a weight. The stem of our own wheat is, you know, a mere hollow straw

You see how necessary it is, my dear children, when you do not perfectly understand what you read or hear, to have courage enough to confess your ignorance, and to ask for explanation.

‘Before we finish the subject of Joseph,’ he continued, ‘I will explain another small circumstance, of which perhaps Bertha at least may not be aware. The ancient manner of eating was for each person to have one or more dishes to himself; they were all first set before the master of the feast, who distributed to every one his portion; and as a mark of affection for Benjamin, Joseph sent him five dishes, while he only sent one to each of the others. In Persia and Arabia, every dish that is set before the master of the house is divided into as many portions as there are guests, but those of the greatest rank have by far the largest shares.’

31st.—Mr. R——, a friend of my uncle’s, has been here for a few days, and has amused us very much.

Yesterday he showed us a Proteus kind of substance: it had at first a milky transparency, and reflected a bluish white light, but when we looked through it, it was yellow. He slightly wetted it, and then it lost all transparency, appearing like chalk. He immersed it completely in water, and the edges became more transparent than before, and at the same time a little gas seemed to escape from it. A small white ball appeared in the centre, but it gradually diminished in size, and the transparency extended through the whole mass.

He afterwards put some of this substance into oils of different colours—the colours it quickly acquired—and when it had completely absorbed the oil, it became transparent; but when partially, it was opaque. When steeped in oil coloured with alkanet-root, it had quite the tints of the ruby; from a preparation of copper it imbibed the colour of the emerald; and from some acid, exactly that of a Brazilian topaz. He then showed us that all these brilliant colours could be discharged, along with the oil, by exposing the substance to a strong heat.

Fortunately for us, when Mr. R. called here he was on his way home from London, where he had provided himself with these curiosities, and he was so good-natured as to unpack some of his treasures for our gratification.

I was much surprised at these cameleon like changes; and at last I learned that this substance is the *tabasheer*,

of which I had read something before. It is found in the cavities of the bamboo; while the plants are young it is fluid, but as they advance in size it hardens. Mr. R. showed us three specimens; the first was almost transparent, and so tender, that, in carelessly taking it up, I crushed it. He was so kind as to say it did not signify, as he had some more; but I determined in future to see without the help of my fingers, as you have often advised me, dear Mamma. The second piece was harder and more opaque, having only a little transparency at the edges. The third specimen was perfectly opaque, and looked like a bit of stucco; it was on this piece that he showed us the curious experiments I have mentioned.

Mr. R. endeavoured to make us comprehend the causes of all those changes which have appeared so contradictory. 'In the first place,' said he, 'tabasheer is a remarkably porous substance; now, if one of the pores be filled with air, a ray of light in passing through it suffers very little refraction, and is therefore so little scattered, that the tabasheer appears transparent, and objects can be partly seen through it. This arises from the small difference between the refractive power of air and of tabasheer. Next,' said he, 'suppose a very small quantity of water introduced into this pore, so as not to fill it, but merely to line it with a film; then the light, in passing through the tabasheer, the film of water, the air within, the film again, and lastly, the tabasheer, is so much scattered by these six refractions, that the substance appears opaque. But when, by complete immersion, the pores are filled with water, the multiplied refractions caused by the films and the portions of air within cease, and the light is more freely transmitted.'

My uncle and Mr. R. talked a long time on the subject, and tried several other experiments, explaining to us the reasons for each step they took; but I have said enough to show you that I endeavoured to understand what they were doing, and this, I am sure, will give you pleasure. Indeed, the advantages of being able to comprehend something of the conversation of such people is so great, that I cannot sufficiently thank you for having given me a little taste for science. You used to say that there was great danger of making girls conceited by giving them a smattering of science; but I assure you that I shall keep a careful watch over myself in that respect: the little knowledge I have is

only a peep-hole through which I see the boundless stores that I can never hope to possess—and surely this can only make me more humble.

Nov. 1st.—I had not time yesterday to say anything of the plant which produces the tabasheer; and perhaps Marianne might like to have the particulars that we were told.

It is the bamboo-cane, which is of the same natural order as the grasses; it grows in both hemispheres, almost anywhere within the tropics, and very abundantly in the East Indies. The main roots are thick and jointed, and from these joints spring several stems, which are sometimes eighteen inches in circumference at the bottom. These stems, or culms, are round, hollow, and shining;—they grow quite straight, and often to the height of sixty feet; and they are articulated, or knotted, the knots being about a foot apart, and each armed with one or two sharp spines. The leaves are narrow, eight or nine inches long, and supported on short foot-stalks; and the flowers grow in large panicles, three or four together, from the joints of the stem.

The stalks of the bamboo, while young, are filled with a spongy substance which contains a sweetish milky juice; but they become hollow as they grow old, except at the joints, where they are crossed by a woody membrane—such as, I believe, there is in the knots of all culms. Upon that membrane the liquor rests, and concretes into the substance called tabasheer, or sugar of Mombu—which was held in such esteem by the ancients, that it was valued at its weight in silver. It had long been used as a medicine all over the East, but was first made known in Europe by Dr. Russell, in 1790.

The young shoots are dark green, and, while tender, make a good pickle; but the old stalks are of a shining yellow colour, and prodigiously hard and durable: they are used in buildings, in all the farming-tools, and in all sorts of household furniture. By piercing the joints they are often converted into water-pipes; and they make excellent poles, by which the porters carry casks, bales, and palanquins. In the island of Java, a sort of palanquin is formed of bamboos, resembling a small house in shape, and called a dooly. In short, there are few plants which have such a variety of uses.

2nd.—This last summer is said by every one to have

been remarkable for the quantity of seed produced by almost all plants ; and acorns were particularly plentiful. Some were gathered for the purpose of sowing ; but an immense number remained under the oak trees in the lawn, till within these few days, when they all disappeared, and what fell from the trees in the course of one day had vanished before the next. After much puzzling about what could have become of them, Wentworth discovered that the sheep eat them ; he caught them in the act to-day. He also observed that chaffinches and other birds eat beech-masts—but I do not wonder at that, for I think them excellent ; and my aunt tells me that on some parts of the Continent they are very much used as food by the poor inhabitants. The oil which is previously expressed from them is of the finest quality ; and in Alsace, as well as all along the borders of France and Germany, the peasants make a sort of cake with the remainder.

I saw the jay to-day for the first time ; Mary showed me several of these pretty birds under a hedge. We watched them for some time, and I actually saw one raise and depress the bunch of black and white feathers on his forehead repeatedly ; the wing coverts are beautiful. Jays are very affectionate to their young, who remain with their parents during all the autumn and winter months, instead of separating early, as most birds do. In winter they are to be seen continually under high hedges, or on the sunny side of woods and copses, seeking for acorns, crab-apples, or for the grubs and worms to be found in fields where cows have pastured. They are timid and watchful, and feed in silence ; but timid as they are, they are very destructive in summer to the gardens.

The Lumleys, you know, live in a very sequestered part of the forest, and the jays seem to have established themselves in that undisturbed spot. Miss Lumley told me that they make great havoc among the beans in June ; and though in general cautious and wary, at that season their boldness is quite remarkable, and nothing seems to intimidate them. She has frequently seen one of the parent birds descend from a tree into the bean rows—they soon announce their discovery by a low but particular scree and then all the family hasten to join in the plunder.

Their throat is so wide that they can swallow beech acorns, and even chesnuts whole ; and it is said they c

imitate various sounds, such as the bleating of a lamb, the hooting of an owl, the mewing of a cat, and even the neighing of a horse.

They appear to be fond of each other, but to other birds they are very troublesome, destroying their nests and eggs, and sometimes pouncing on the young ones, to the great vexation of the Lumleys.

4th.—Those poor travellers, whom more than a month ago I told you that good Mrs. Ando had so generously taken into her own house, have been obliged to continue there ever since; and my aunt has two or three times driven to Newnham to visit them. They have, you know, one little child, but the man seems to be dying, and his wife, a foreigner, nurses him with the most tender care. They have told their history to my aunt, and she has given me leave to relate it to you.

The young woman is a Swiss, her name is Madeleine, and her father was a merchant of Geneva, where they lived in comfortable affluence till his wife died. His affliction on this occasion was so violent, that he resolved to quit Geneva for ever, and remove to a city in the South of France, where he might continue his business; but Madeleine was tired of a town life, and persuaded her father to give up commerce and retire to a little property he possessed in the district of Beaufort, in Savoy. She had formed delightful pictures in her imagination of the occupations of the farm, the vineyard, and the dairy, and she longed to realize them.

Her indulgent father yielded to her wishes, and they removed from all the comforts of Geneva to that remote and mountainous district. When they arrived, and that she saw the change which she had persuaded her father to make, she felt severe regret for having interfered; and would then have persuaded him to return, but he had arranged everything for his residence in Savoy—he had made his decision, and he would not let it be again shaken.

His activity in a short time made the house comfortable, and he employed his time and his money in forming a garden and an extensive vineyard. The industry which he had devoted to trade, he now directed to the cultivation of the vine, and his unwearied assiduity was rewarded in a few years by a profusion of grapes, of which he made excellent wine. Everything seemed to prosper, and Madeleine dearly loved a place where they had conquered so

many difficulties, and where they had seen comfort and plenty rise out of a bare and rocky valley; a place which, with their endeavours to shelter and beautify it, and with the ornament of a remarkable group of fine old walnut trees on the hill behind the house, was now quite picturesque. The poor around them had also reason to like the change, for many a distressed family were now employed, and many an ignorant child was taught as well as clothed by Madeleine. But her father had laid out all his ready money on the vineyard, and on a large stock of cattle; so that everything depended on the success of his plans.

According to the custom of the country, their cattle were sent every summer, with those of the neighbours, to the fresh air and sweet pasture of the mountains. They were all intrusted to the care of one person, who, during the season, lived on the top of the mountain, in a little wooden hut, called a *chalet*. There the milk of the cattle was collected; and in eight days after the cows had been driven up to the common pasture, the owners assembled, and the quantity of milk from each cow was weighed. The same thing was repeated once in the middle of summer; and at the end of the season the whole quantity of cheese and butter was divided in due proportion. The cattle were then driven back to the valleys, when there was a general festival, in which the whole *commune* joined. All the young people used to assemble at the chalet, on this occasion, in their holiday dresses, decorated with Alpine flowers; and with all the gaiety of youth, and with songs and dances, they attended the descent of their herds, which were also decked with ribbons, and bells, and garlands. At intervals the party sung together the touching song of the *Ranz des vaches*, or some of the pretty Savoyard airs.

On the morning of one of these festivals, a traveller, who had missed his way in crossing the mountain, happened to apply at the chalet for assistance. The youthful crowd were actually setting out—the song which announced the general movement had already commenced—when seeing that the traveller was faint, and in want of assistance, they stopped, and hastened to relieve him. They gave him such refreshment as they could; and, unmindful of their own interrupted pleasures, they delayed their march to give him time to recover. When he was sufficiently revived by their hospitality, he accompanied the gay party to the villa;

and, charmed by their simple manners, he joined, as well as he could, in their happy and innocent festivity.

The traveller was an English officer, who had been wounded. He was then enjoying the bracing air and wild scenery of Savoy; and though he intended to winter in Italy, he wished to loiter a little longer among the glens and mountains of this picturesque country. Madeleine's father was interested by his appearance of ill health, and pleased by the manner in which he expressed his gratitude for the kindness he had received, and therefore invited him, whenever his wanderings should lead him that way, to take up his quarters at Beaufort. He came more than once in the course of the autumn, and was always welcomed with warmth and hospitality by the good old Swiss and Madeleine.

At length he bade them adieu, and pursued his way to Italy, leaving them in happiness and prosperity. At the end of two years he again returned, and found them sunk into poverty and misery. The overflowing of the Doron, early in spring, had caused universal destruction in the valley: houses, gardens, and vineyards were swept away; and even the cattle, which were to have gone in a few weeks to the hills, were included in the general ruin. All was gone—a few hours had reduced these amiable people from affluence to absolute want. He who had been master there—whose active head and industrious hands had planned so well, and executed so much, was now the passive object of his daughter's cares. The shock had irreparably injured his mind, for he had spent his whole fortune in making this place for her, and he had now the melancholy consciousness that both were beggars. But Madeleine's energy rose above misfortune. She turned her whole thoughts to the comforts of her father, and the means of procuring them; and she earnestly prayed for the blessing of heaven on her exertions.

As soon as they were settled in a very small cottage in the neighbourhood, she determined again to try the cultivation of the vine—but considerably higher on the side of the hill—so as to be secure from a second inundation. She intended to have laboured at this new plantation herself, with the assistance of one old and attached servant, but numbers of people from the neighbouring villages, who loved her, and were grateful to her, insisted on being allowed to help.

It is a common custom in Switzerland to plant vines on very steep hills, with alternate rows of dry stone walls, to preserve the soil about the plants ; and Madeleine resolved to accomplish such a vineyard. By the assistance of these good-natured people, a small plantation was made : while some were digging, others built the little walls ; and Madeleine herself guided the donkeys, which were laden with earth to make a sufficient soil, or with her own hands disposed it round each vine plant, and dressed the whole.

Though the vineyard was small, she hoped to derive an additional benefit from it for her father by planting a few useful vegetables, which might, perhaps, interest him in his favourite occupation of gardening. But when she tried to rouse his mind to this, he only wept at the loss of their former pretty garden, for which they had both done so much.

The group of walnut-trees still remained ; and, fortunately, they bore remarkably well. The gathering of the fruit and the pressure of the oil is one of the most important occupations of the Savoyards, and Madeleine was again assisted by her kind neighbours. The walnut harvest commences about September : the fruit is beaten off the trees with long poles, and the green husks are taken off as soon as they begin to decay ; the walnuts are then laid in a chamber to dry, where they remain till the end of autumn, when the process of making the oil commences. The first operation is of course to take out the kernel, and for this the neighbouring peasantry collect. They are usually placed at a long table ; a man at each end of it cracks the nuts with a mallet, by hitting them on the point ; and, as fast as they are cracked, they are distributed to the persons round the table, who take out the kernels and remove the inner part. The Savoyards are so lively, that this employment is in general accompanied by songs and various amusements. The day that Bertram, their English friend, returned, Madeleine was thus occupied while her poor old father, placed in a chair beside her, was gazing vacantly at what they were doing.

Though changed so much in circumstances, she did not appear dejected—she had not sunk into despair ; a though her countenance, as he told my aunt, no longer expressed gaiety, yet even in her tears, she had the smile hope and cheerfulness. He had always esteemed her, a

lutely useless. if you do not, by daily recalling what you have read, endeavour to class and arrange it in your mind ; can you feel alone and dull when thus engaged ? and is not that retired walk exactly suited for such employment ? But, come with me, my dear,' he added, ' and I will show you sufficient to occupy both eyes and mind even in that dull place.'

A walk with my uncle is one of my greatest pleasures, dear Mamma. I was ready in a minute—and to the beech-walk we went, but it was no longer a dull walk ; all he says is so delightful, and he listens so patiently to every question. After a few turns, in which I entirely forgot the north-east wind, he said, " There is no place, my little Bertha, that does not present some objects of interest to those who choose to open their eyes. For instance, even on this rough ditch, and on the old wall that joins it, you may see a curious variety of vegetation, which your finest embroidery cannot equal. Look at those mosses ; they are among the meanest plants, yet there is not one that is not worth examining. The fructification is still to be seen on that tuft of *bearded thread moss*. Take your little magnifying glass, and look at the cup which is so delicate and yet so firm, its edge strengthened by that finely-toothed ring, to which the slender conical lid is exactly fitted ; its pointed top, you see, serves to attach that little shining scaly membrane, which is the principal defence of the flower and seed from the weather, and which is called the veil or *calyptra*.

' Now, Bertha, look at this *silver thread moss*, here on the walk, with its diminutive leaves so closely pressed to the stem as to be hardly visible ; it is now quite green ; but in some weeks it will become of a shining silvery white, especially when dry ; and this circumstance distinguishes it from all other mosses.'

I asked him the name of the moss that is so common on the roots of the trees, creeping through the grass round m, and growing in tufts of long crowded shoots ;—he told me, that those long crowded shoots mark that species, and he showed me the brown fibres by which they cling to the trees ; and the leaves which grow in double rows, being in little crooked hairs ; he called it the *trailing feather moss*. He seemed to take as much pleasure in explaining a thousand things about them as I did in listening.

How stupidly I had walked up and down there, and never cast my eyes on the beautiful structure of these little plants! We then examined several lichens, some in tufts, hanging from the branches of trees and bushes, or encircling them with their crisp flat leaves; others covering the stems with an odd white crust; while on the damp earth beneath we found the *cup lichen* in deep sea-green patches, displaying its tiny cups like fairy wine-glasses.

'On those stones,' said my uncle, 'you may trace the beginning of all vegetation, from the little black spots, which are scarcely discernible, to the larger lichens and mosses of different forms and sizes. Or, let us turn to the grassy bank, and you may there see a great number of herbaceous plants, still green, mixing with that useful grass, the creeping bent, which throws out fresh pasture at this late season from the joints of its runners or *stolones*.'

He showed me many of these plants; and more than once said, 'Everything here is interesting to persons of observation, and particularly so to those who know something of Botany. But they are not merely for momentary examination—the variety and the design to be found in each supply ample subject of reflection.'

Just at that moment I heard a shrill cry, and I interrupted my uncle to ask what it was.

He told me that it was the alarm-cry of the fieldfare, and pointed to a large tree at the end of the walk, where a number of fieldfares and redwings, lately arrived from a colder climate, had collected.

'You see,' said my uncle, 'that even without any fine picturesque view, you may have abundance of amusement here, not only in observing the growth of mosses and plants, but in watching the habits of birds. You may see the little woodpecker, and the still smaller creeper, running nimbly up the stems of the trees, and pecking insects and their eggs out of the crevices of the bark; or the fauvette and the friendly robin waiting on every spray for a little notice: while in the thickets to the left you may see the missel thrush, and may sometimes distinguish its note, though it does not actually sing at this season.'

As my uncle said this, we approached the tree on which the fieldfares were perched: they seemed at first unmindful of us; but, as we came nearer, one bird which I had served sitting alone at the very end of a branch, rose -

denly on its wings and gave a cry of alarm, which was the same I had heard before. The moment this happened, they all flew off together, except one, which remained there till we almost reached the tree, when it repeated the same cry and followed the rest.

My uncle told me that this is the constant habit of these birds; they arrive late in autumn, and always collect in a flock, placing one on the watch to give the alarm. When they spread over a field in search of food, they never separate much, and fly off in a body at the first notice of their sentinel. The redwing sings sweetly in its native country, Sweden, though here it makes only a piping noise. As we walked along, he told me that fieldfares were formerly kept in aviaries by the Romans, who fattened them on bread and minced figs; during which process very little light was admitted, and all objects were excluded from their sight that could remind them of their former liberty. We watched these birds for a long time; and as we returned home, my uncle said, 'But in suggesting these subjects of observation, Bertha, I do not mean that you should always stand still in the cold to examine them; nor do I suppose that in one walk you could attend to such a variety of objects. I only want to show you how much amusement a solitary winter's walk, even along a *dull* straight high ditch, can supply for both eyes and thoughts.

'Besides all these, you, my little botanist, might have another endless subject for examination in our deciduous trees, on many of which you will find that, unlike those of tropical climates, the young shoots, leaves and flowers, are formed in autumn, and cradled up in scaly buds, where they are secure from frost, till the following spring.

'Indeed, the comparisons you must be naturally induced to make between your two countries might supply you with amusing and useful occupation; and the result will be, that in each you will discover how peculiarly every creature, and every vegetable, is adapted to the country where it has been placed.'

WEEK 14.

Why Shepherds were an abomination to the Egyptians—Hooded Crow—Discussion on Genius—Anecdotes of West, Canova, and Chantrey—Houses in Dongola.

Nov. 6th.—Sunday. I asked my uncle this morning, why Joseph said that every shepherd was an abomination to an Egyptian; and also, why Joseph expected, that when Pharaoh was informed that his father and brethren were shepherds, he would order them to dwell in the land of Goshen?

‘In the first place,’ said he, ‘it is supposed that Egypt had been invaded and subdued by a tribe of warlike shepherds from Arabia, called Cushites, or sons of Cush. They were also called the Pali, or shepherds; and their leaders called themselves the Shepherd-Kings. Six of these Shepherd-Kings are said to have successively reigned in Egypt, till at length the native princes, weary of their tyranny, rebelled and expelled them. They retired into the land of Canaan, and established themselves at Jerusalem, and in other strong situations in that country, which, from them, obtained the name of Palestine, or Palistan—the country of the Pali. These people afterwards became the Philistines, who were such troublesome neighbours to the Israelites.

‘The memory of their tyranny was still fresh in the minds of the Egyptians, at the time that Joseph’s family removed to Egypt; and it was, therefore, natural that every shepherd should be an abomination to the Egyptians. Cush, you know, was the eldest son of Ham; the Egyptians were descended from Mizraim, the second son of Ham, and Egypt is to this day called Mizr, by the Arabs and Abyssinians.

‘As to your second question,’ continued my uncle, ‘in regard to their being ordered to dwell in the land of Goshen, it appears probable that there had been shepherds in those parts before; otherwise Joseph could scarcely have foretold that that portion of the land would be given to his brethren. Besides which, Goshen being chiefly adapted to pasture, which was so contrary to the taste of the Egyptians, that region, most likely, lay neglected. Hence we see why Israelites found such easy access into the country, so as only to be allowed to dwell in it, but to have the land

Goshen given them for a possession, even the best of the land of Egypt.'

'I wonder,' said Wentworth, 'why the Israelites were sent by Providence into Egypt, as they were, after a time, to be placed in Canaan, the land of promise, and would, therefore, be again unsettled and obliged to remove?'

'It has been suggested,' said my uncle, 'that the promise made to Abraham, to give to his posterity the land of Canaan, was not to be fulfilled till this great family of Israel was strong enough to take that land by force from the inhabitants, and to keep possession of it. Besides, the Canaanites had not then completed the measure of their wickedness, which was to be punished by the loss of their country.'

'In the mean time, though the Israelites were obliged to reside amongst idolaters, and were enjoined to preserve themselves unmixed; yet Egypt was the only place where they could, for so long a time, remain safe from being confounded with the natives. For the ancient Egyptians were, by numerous institutions, forbidden all fellowship with strangers; and having a particular aversion to the employment of the Israelites, they were, by that means, more completely separated. Besides, during their long residence of above 400 years in Egypt, the Israelites, who were but simple shepherds when they went there, had the advantage of acquiring a knowledge of the various arts in which the Egyptians excelled.'

'The Bible here, as in many other cases, only records the facts: we cannot now penetrate, my dear boy, into the causes or motives which led to them: but we may be sure that what was dictated by Infinite Wisdom was just and proper; and in venturing to assign such reasons as we can infer from other circumstances in history, we should do so with great modesty and distrust of ourselves.'

7th.—My uncle has been obliged to go to London about business; he left us this morning, but his stay will not be very long, I hope, for we shall miss him excessively, and the more so, as winter is completely begun. We have now dark days, with frequent rain and storms; some trees have not even a withered leaf remaining, and everything out of doors has a forlorn and desolate appearance.

But we have still some flowers; the China rose is yet in bloom, and in the sheltered warm borders we find a few

wall-flowers, some lilac primroses, and many Neapolitan violets, which are delightfully sweet.

9th.—When we were walking this morning in the forest, Frederick made me take notice of a flock of crows, which were quite different in appearance from the common rook. The back is ash-coloured, while the head, throat, wings, and tail, are black. I was surprised at my own blindness in not having observed them before ; but Frederick told me that they had only arrived lately, as they change their abode twice in the year. About the middle of autumn, they appear in the southern parts of England in flocks ; and in the beginning of spring they depart in a northerly direction ; though in some parts of Scotland and Ireland they remain through the whole year. This species is still more familiar than the rook, and in winter will go even to the yards of houses to pick up food. It is called the hooded crow, or scare-crow. I heard it give two cries ; one was the hollow hoarse note of the crow, but the other was shrill, and not very unlike the crowing of a cock. They are remarkable for this double cry.

Mr. Landt, in his description of the Feroe Islands, says that one or two hundred of these birds sometimes assemble, as if by general consent. A few of them sit with drooping heads, others seem as grave as if they were judges, and others again very bustling and noisy. The meeting breaks up in about an hour, when one or two are generally found dead on the spot ; and it has been supposed, by those who have observed them carefully, that they were criminals punished for their offences. Frederick says he has read, that in the Orkneys, too, they meet in spring, as if to deliberate on concerns of importance ; and after flying about in this collected state for eight or ten days, they separate into pairs, and retire to the mountains.

Along with those, we saw several carrion crows with their glossy plumage of bluish-black ; they not only associate with rooks and other crows, but approach our dwellings and saunter among the flocks ; and I really saw some hopping on the backs of pigs and sheep, with such apparent familiarity, that one might have imagined they were domestic birds.

Towards the close of winter the hooded crow and rook remove to other regions, but the carrion crows resort to the nearest woods, which they seem to divide into separate

districts, one for each pair; and it is remarkable that they never intrude on each other's portions.

Crows may well be called *omnivorous* birds, for they eat everything—flesh, eggs, worms, grain, fish, and fruit. Shell-fish, it is said, they very ingeniously crack by dropping them from a great height on a stone. Many people have seen this; and the great Mr. Watt, whose observation was always alive, watched one of these sagacious crows taking up a crab into the air, which it repeatedly let fall on a rock, till the shell was completely broken. The same ingenuity has been observed in another species of the crow family, in North America: a blue jay, which had been tamed, finding the dried seeds of Indian corn too hard to break, placed one in the corner of a shelf in the green-house, between the wall and a plant box: having thus secured it on three sides, he easily contrived to break it; and, having once succeeded, he continued ever after to apply the same means.

10th.—We have had a grand discussion, in our walk this morning, on genius. Mary's opinion is, that it never exists originally; and that wherever biography affords us the opportunity of learning the small circumstances of early life we may observe that something had occurred to turn the attention, while young, to that pursuit in which successful perseverance had been afterwards ascribed to genius. For instance, in the thirteenth century, some Greek painters being employed in the churches of Florence, the youthful Cimabue gazed for whole days in admiration of their work: he afterwards devoted himself to the art, and quickly surpassed his masters. Here, but for the circumstance of the Greek painters, his talent might have remained unknown, even to himself.

'But,' said Caroline, 'his own pupil, Giotto, may be opposed to your theory; you know he was a shepherd boy, whom Cimabue found accurately drawing the figures of his sheep on the sand.'

'I confess,' said Mary, 'that does seem rather against me, but we do not know what previous opportunities he might have had. Canova's genius, it is said, showed itself in the obscurity of village life; yet we learn from his Memoirs that he lived with his grandfather, who, though only a common stone-cutter, was in the habit of designing and working architectural ornaments; and surely that accounts for the tendency of his pupil's mind.'

'Very well,' replied Caroline, 'I will leave you in possession of Canova, and only ask what you think of West—the great West? Belonging to the sect of Quakers, who disapprove of making any representation of the human form, and born in North America, where the arts were not at that time cultivated, he had never seen any sort of drawing; yet, while he was a very little boy, being desired to watch a sleeping infant, he was so charmed with its little face and attitude, that he made an excellent sketch of it with a bit of half-burned wood. Was not that, Mary, from the impulse of genius?

'I see,' said Wentworth, 'that Mary does not think herself quite conquered; but, as it is going to rain, suppose we adjourn the debate, as papa says, to another day. Caroline shall then have Bertha on her side; I will do my best for Mary, as a true knight is bound to assist the weak; and Frederick shall be the umpire, and adjudge the wreath of victory.'

We all agreed to this plan; and I am sure it will produce a great deal of amusement. My aunt approves of these good humoured contests, in which we never lose our temper, and all gain information.

11th.—Our *genius* conversation of yesterday having been mentioned in the evening at tea, my aunt encouraged us to repeat our arguments, and to defend them by fresh examples; and so nicely threw herself, sometimes into one scale, and sometimes into the other, that both parties valued themselves on her support. I am rather in doubt which will amuse you most—the anecdotes of various people that she related, or some circumstances in Canova's life that my aunt afterwards told us: I believe these interested me the most, so I shall begin with them.

'The beautiful country round Passagno, and the refreshing breezes from the Alps, made it a frequent summer residence for the Venetian nobility. Old Pasino Canova, who lived there, was often employed in the repairs or embellishments of their villas, and on these occasions he was accompanied by his grandson. Young Canova thus became known to the senator Falier, who was afterwards his most zealous patron; and an intimacy was formed between him and Giuseppe Falier, the youngest son, which ceased only with Canova's life.

'The ingenuous disposition of Canova, his anima:

countenance, and his modesty, interested the elder Falier; and he took him, when about twelve years old, under his immediate protection. But it was by a mere accident that his talents were first noticed. At a festival, celebrated at the villa of Falier, and attended by many of the Venetian nobility, the domestics had neglected to provide an ornament for the dessert. The omission was not discovered till it was too late; and, fearing the displeasure of their master, they applied to Pasino, who, with his grandson, was then at work in the house.

‘The old man could suggest no remedy; but young Antonio desired to have some butter, and in a few moments he modelled a lion, with such skill and effect, that, when it appeared at table, it excited the attention and applause of all present. The servants were questioned—the whole was disclosed, and little Tonin declared to be the contriver. He was immediately called for; and, blushing and half reluctant, was led into the brilliant assembly, where he received universal praise and caresses.’

‘There is a circumstance strikingly similar to this,’ continued my aunt, ‘which is told of our celebrated sculptor, Chantrey, and of which, I believe, there is no doubt, as I was told it by a person to whom Chantrey, with noble candour, had himself communicated it. When quite a boy, not more than nine or ten, he used frequently to visit his aunt, who was housekeeper to a lady of fortune in Derbyshire. During one of these visits, it was observed that the flowers and ornaments of the pastry at table were executed with particularly good taste; and the housekeeper acknowledged that she had allowed her little nephew to amuse himself in making whatever ornaments he fancied. The lady determined on giving him other opportunities of trying his talents, and, finding how very superior they were, she actually sent him to London to receive instruction. With what delight this benevolent and judicious woman must now behold the works of this great artist, and how much she must enjoy the fame which he has so justly acquired!’

‘The progress which Canova made, and the perfection even of his earliest works, is known to all the world; but perhaps you may not have heard that, during his whole life, both while suffering opposition from envious artists, who threw every obstacle in his way, and afterwards, when he had attained the highest success, he preserved his unpre-

tending modesty and simplicity. He neither yielded to occasional disappointment, nor to the vanity of showing that he could surpass his rivals. Improvement was the one great object which he unremittingly pursued, and all his ideas were subjected to rigid examination: he compared them first with nature, and he then flew to the Vatican, where he compared them with the antique.—The result always calmed his solicitude; he returned with fresh confidence to his *studio*, and in solitude laboured to perfect his style, without either boasting to his friends, or triumphing over his opponents.

‘This modest reserve always marked his conduct. To the observations of friends, whether of approbation or criticism, he seldom replied. “To praise,” he used to say, “what can I answer?—to the censures of well-wishers I must listen in silence; for, if wrong, their feelings would be hurt by telling them so; and, if correct, I endeavour to profit by their remarks.” But it frequently occurred that he reminded his friends of their former criticisms, and candidly pointed out the consequent correction.

‘His high talents were combined with the most amiable disposition, and a most grateful heart. His good old grandmother lived to see the success and the excellence of the object of her care; and Canova, who cherished every affectionate feeling, enjoyed that first of pleasures—the repaying former benefits. After the death of his grandfather, he brought her to reside with him at Rome, and his friends still remember his tender anxiety to make the close of her life happy.

‘Canova sculptured the bust of his grandmother, in the dress of her native province, which was the same as that of Titian’s mother; and this bust he kept in his own apartment.—Pointing it out one day to a visiter, he said, with much emotion, ‘That is a piece which I greatly value;—it is the likeness of her to whom I owe as much as it is possible for one human being to owe to another:” adding, “you see she is dressed nearly as Titian’s mother; but a less affection renders me a partial judge, my grandmother much the finer old woman.”’

12/h.—Mary has a most enviable memory; she has just been entertaining me with what she read in Waddington’s Travels in Dongola.

She says, the houses there are either a sort of mud f

tresses intended for defence, or else low cottages of straw and branches, tied together with bands, and supported at each corner by the dry stem of a palm, to which the walls are united.

The vale of Farjas is described as a most romantic little spot; a green and cultivated valley, not two hundred yards broad, closely shut between a range of high granite rocks and a narrow branch of the Nile, and flourishing in freshness and fertility, in the middle of the wildest waste. The simple inhabitants offered a great many little civilities to Mr. W. and his companions.

She mentioned also two very curious passes through the hills; one called the 'Pass of the Water's Mouth,' near the entrance of which are two immense stones, as regular as if formed and placed there by art; and the other a winding pass amongst high rocks, that required an hour and forty minutes to travel through it: it is oddly called 'The Father of the Acacias,' though, from beginning to end, it contains not one symptom of vegetation.

But I can write no more now; for my aunt has sent for me to walk with her, if I am so inclined—and that indeed I am.

WEEK 15.

The History of Moses—Papyrus, Manufacture of Paper—Derivation of the Word—Spider's Diving Bell—Silk woven by Caterpillars—A Mummy examined—Colonel Travers arrives—Observations on India—Hunting Wild Beasts—Colonel Travers' danger.

Nov. 13th.—Sunday. The conversation, at breakfast this morning, having turned on the history of Moses, my aunt observed, that the entire account of his life is told in the most plain and artless manner, unmixed with any circumstances likely to exalt his personal character, and is throughout distinguished by that candour and impartiality with which Moses always speaks of himself.

I asked her, how soon after the death of Joseph the destruction of the male-children of the Israelites was decreed by Pharaoh.

'There is reason to think,' said my aunt, 'that it was about sixty-four years after the death of Joseph; probably soon after the birth of Aaron, who had not been subject to his decree; and about one hundred and thirty-three years after their settlement in Egypt.'

'You are of course aware, Bertha,' continued she, 'that Pharaoh was the title of all the Egyptian sovereigns at that ancient period; the Pharaoh who had favoured Joseph was dead, and his successors were ill-disposed towards the Israelites, who had increased so much, that the Egyptian kings began to fear them, for they still recollected the thralldom in which they had for a long time been held by the Cushite or Shepherd invaders. And besides, Egypt was still subject to incursions from the Arabians, on that very side where the Israelites dwelled; which accounts at once both for their jealousy of the Israelites, who had the power of betraying them, by admitting the invaders, and also for the fear expressed by Pharaoh, lest they should "get them out of the land;" because, as long as they were in Goshen, they were, if faithful, a sort of defence to his kingdom, by being thus situated on its frontiers.

'But to return to the history of Moses—the ark of rushes which his mother "took for him," was a little vessel or basket, made of reeds, and daubed with slime or pitch, to keep out the water; it was probably of the form of one of those boats with which the river was always covered, and made like them of "bulrushes," by which is meant the papyrus of which the Egyptians made their paper, and which grew in abundance on the banks of the Nile. This papyrus was strong enough to resist the water, and well adapted, by its lightness, to swim with a child's weight. The vessels of bulrushes mentioned in both sacred and profane history were made in the same manner, on a larger scale. Bruce, the traveller, saw them in common use in Abyssinia; and even at this day they are to be seen on the Nile; though the introduction of plank and stronger materials has caused them to be laid aside in a great degree.

'It was customary for the Egyptian females to express their veneration for the Nile, by plunging into it, when it began to overflow the country; and it is probable that when the daughter of Pharaoh bathed, it was in compliance with some such custom. Modern travellers tell us the ceremony is still observed by the Egyptian females, of going to solemnize, with songs and dance, and bathing, the visible rise of the Nile.

'Observe here, my dear children,' continued my a 'the chain of small circumstances by which God leads us kind to the accomplishment of his high decrees. When

daughter of Pharaoh goes to celebrate a heathen ceremony—when she finds the babe, and calls the Hebrew woman to be his nurse, and when that nurse turns out to be his own mother—what a singular concurrence of events, simple and obvious in themselves, but wonderful in their combinations!

‘Josephus, the Jewish historian, states that Pharaoh’s daughter was married, but had no children, and therefore adopted Moses, and gave him a princely education; that he became a man of eminence amongst the Egyptians, was made a general and leader of their armies, and fought some battles with success. While he was instructed in all the wisdom of the Egyptians, he was taught at home a knowledge of God: his father, Amram, imparted to him the promised redemption of Israel, and his mother fixed the true faith in his heart; so that it became the guide and the principle of all his actions.

‘The land of Midian, to which Moses fled when he killed the Egyptian in defence of the ill-treated Israelite, was a part of Arabia Petræa, where some of Abraham’s posterity were settled; it lay upon the farther side of the Red Sea, to the east of the wilderness of Sin. During his long absence from Egypt, Moses never forgot that he was separated from his family and his nation; and to mark his feelings, he called his son Gershom—a desolate stranger. While he was thus an exile, he was trained in the school of adversity; his faith was strengthened, so that it prepared him for the arduous mission which he was born to undertake; and he became “meek above all the men which were on the face of the earth.” No man, indeed, had greater trials; but about them, and the important part he afterwards performed, I will take some other opportunity of conversing with you.’

14th.—I had so many questions to ask about papyrus, that I thought it better not to interrupt my aunt yesterday, when Moses was more particularly the subject of our conversation. This morning, however, I begged of her to tell me some particulars about the paper made from that plant, and I will now put down here the substance of what she told me.

‘The *papyrus*, or Egyptian reed, as it is called, grows in the marshy ground caused by the overflowing of the Nile, and rises to the height of six or seven cubits above the water. The stalk is triangular, and terminates in a crown

of small filaments, resembling hair, which the ancients used to compare to a *thyrsus*. It was very useful to the inhabitants of the country where it grew, for the stem not only served for building small boats, but was likewise used for making cups and other utensils. The pith of the plant was eaten as food; and the root, being full of a sweet juice, was frequently chewed.

'But the manufacture of paper was the most important of all its uses; for I need not tell you, Bertha, that before mankind had some means of noting events, the recollection of them was either lost or became so mixed with error, in being preserved by mere oral tradition, that we have no records of the ancient transactions of the inhabitants of the globe, except those contained in the Bible, which were, you know, written by Moses retrospectively. Before the invention of letters, mankind may be said to have been perpetually in their infancy, as the arts of one age or country generally died with their inventors.

'When the outer skin or bark of the stem of the papyrus,' continued my aunt, 'was taken off, several slender films or pellicles were found, one within the other. These pellicles were carefully separated with a pointed instrument, and spread on a table, so that the thickest parts were all ranged together. On these, another layer of pellicles was then transversely placed in a similar manner, and moistened with Nile water; the whole was heavily pressed, and, when dried in the sun, formed a smooth substance well fitted for writing upon with pens made of hollow reeds, through which a coloured liquid was allowed to flow. The saccharine juice in the bark helped to make the adhesion perfect, but sometimes a thin coat of gum was laid upon the first layer. Thus large sheets were prepared for writing, and when formed into books, the boards or covers, we learn from some of the early Greek writers, were made from the woody parts of the same plant.

'The Egyptian name of this plant is *Babr*, from whence both *papyrus* and our word *paper* seem to have been derived. The bark of a species of mulberry-tree was afterwards used for paper; and *liber*, which properly meant the bark of a tree, was, therefore, applied to signify a book.'

Caroline, whose memory always serves her at the right moment, immediately repeated these lines:—

Papyrus, verdant on the banks of Nile,
 Spread its thin leaf, and waved its silvery style ;
 Its plastic pellicles Invention took,
 To form the polish'd page and letter'd book ;
 And on its folds with skill consummate taught
 To paint, in mystic colours, sound and thought.

My aunt smiled, and then added,—‘ To form those little bulrush vessels that are alluded to in the Bible and elsewhere, the papyrus was made up in bundles ; and by tying these bundles together, and placing a piece of timber at the bottom to serve as a keel, they gave their vessels the necessary shape. Several ancient writers describe them ; Lucan speaks of the Memphian or Egyptian boat, made of the *thirsty* papyrus ; which corresponds exactly with the nature of the plant, as well as with its Hebrew name, which signifies to drink or soak up.

‘ This plant requires so much water, that it perishes when the river on whose banks it grows is much reduced ; and it is for that reason that Job mentions it as the image of transient prosperity.’

15th.—My uncle has returned, to the joy of the whole family : he looks a little tired, but seems rejoiced to be at home. He has seen numbers of curious things, and has already told us some of them

One thing that he mentioned was very interesting to me : he met a gentleman who had lately arrived from our southern regions, and who had seen that wonderful luminous creature of those seas which I mentioned to you in my journal when on board of the Phaëton. According to this gentleman's account, each of these brilliant animals diffused a sphere of light of eighteen inches in diameter : ‘ Think then,’ said he to my uncle, ‘ what the effect must be on the spectator, when the sea is absolutely full of them as far as the eye can reach, and to many yards in depth.’ One evening, in particular, from seven to eleven o'clock, the ship sailed upwards of twenty miles through these living lamps ; and the strong light they gave enabled him to distinguish many fishes, even ten or twelve feet beneath the surface of the water, that appeared to be accompanying the ship.

My uncle then gave us a very entertaining account of an experiment he witnessed on the common house-spider, which proves that it possesses a natural diving-bell, to assist it in crossing water. The spider was placed on a small

platform, in the middle of a large tumbler full of water, the platform being about half an inch above the edge of the glass, and two inches above the water. It first descended by the stick that supported the platform, till it reached the water; but finding no way to escape, it returned to the platform, and for some time employed itself in preparing a web, with which, by means of its hinder legs, it loosely enveloped its body and head. It again descended, and without hesitation plunged into the water, when my uncle observed that the web with which it was covered contained a bubble of air, probably intended for respiration. The spider, wrapped up in this little diving-bell, endeavoured on every side to make its escape, but in vain, on account of the slipperiness of the glass; and after remaining at the bottom for about thirteen minutes, it returned, apparently much exhausted, as it coiled itself closely under the platform, and remained there for some time without motion.

Another beautiful thing that my uncle was shown by Dr. W. was a veil woven by caterpillars—actually a gossamer veil. The ingenious person, a German, I believe, who had managed those little manufacturers, spread them over a large glass, and contrived to place them so that the work of each was connected with that of its neighbour. As he could direct or change their progress at pleasure, he was not only able to form the veil of a tolerably regular shape, but, by sometimes inducing them to go two or three times over the same spot, to give it the appearance of flowered lace. The whole veil, though of a large size, weighed only three grains and a half; and a breath blew it up into the air, where it floated like a cloud.

16th.—When my uncle was in town, he was present at the opening and examination of an Egyptian mummy, along with several members of the Royal Society. Some mummies, he says, have two cases; in these, the outer one is ornamented with stripes of painted linen, and the inner case is covered with a kind of paper on which figures and hieroglyphics are painted with great brilliancy of colour.

The one which he saw had but a single case, which appeared to be made of sycamore wood, two inches thickness, the back and the front being fastened together by pegs. The case is made to stand upright, and is covered inside and out, with a kind of shell or coat of plaster, of considerable thickness. This coat is painted outside with

hieroglyphics in horizontal lines on a deep orange ground; and the whole is highly varnished. The internal surface is likewise divided into broad stripes, alternately white and yellow; and on both are inscribed hieroglyphics and other characters, about an inch long, probably consisting of prayers or invocations for the dead, or perhaps of some biographical notice.

My uncle told us that the embalmed body was most carefully secured from the air, by a covering of cerecloth, and by bandages that were applied with a neatness and precision that would have done honour to the most skilful surgeon of modern times. Of the many species of bandages which are employed in surgery, there is not one that did not appear to have been used; and they were so many times repeated, that, after their removal they were found to weigh twenty-eight pounds. Each limb, nay, each finger and toe had a separate one; and, over all, another of great length, which, though without stitch or seam, after making a few turns round both feet, ascended spirally to the head, from whence it returned as far as the breast, and terminated there in loose threads like a fringe. In unravelling all these bandages, my uncle and everybody were struck with the judicious selection of their size and form, so as to adapt them to the different parts, and to give the whole a smooth surface without a wrinkle.

They appeared to be made of a strong, compact kind of linen, and were all of a dark-brown colour—the result, probably, of some vegetable solution that contained a large proportion of the *tannin* principle. Many of them were daubed with wax and some resinous or bituminous substance; and some little crystals were found, from which a chemist who was present seemed to think that lime had been used in preparing the skin.

The circumstance that most astonished my uncle was, that some of the sinews were still elastic and flexible, and that the joints moved as easily as in a living body. My aunt and he had afterwards a long conversation on the rigin of the ancient Egyptians: the principal circumstance that I picked up was, that the celebrated Cuvier has examined the skulls of above fifty mummies, and that, in his pinion, they have the same characters as those of the Armenians, Georgians, and Europeans; or, to use his expression, that the common origin of them all was Caucasian.

The skull of that which my uncle saw leads to the same conclusion, and differed essentially from the form of the negro head. It is a curious fact, which he says has been noticed by more than one traveller, that whole families are still to be found in Upper Egypt, in whom the general character of the head and face strongly resembles that of the mummies discovered in Thebes, as well as the figures represented in the ancient monuments of that country.

17th.—A friend of my uncle's, Colonel Travers, who has lately returned from India, where he served for many years, arrived here yesterday. He has been in various parts of the East, and is so entertaining, that I am sure I shall forget to note down half the curious things which I have heard him mention.

The conversation turned on bees, and he told us that in Mysore, where he was for a long time stationed, he saw four different kinds. That which makes the finest honey is a beautiful little bee of a very small size, and which does not sting. It is called the *cadi*. It forms its combs round the branches of trees; the honey is excellent, and can be procured with very little trouble, as the bees are easily driven off with a switch. But the bee from which the greatest quantity of honey is procured is large and fierce, and builds under projecting ledges of rock or in caverns. The honey is gathered twice a year, for which purpose the people kindle a fire at the foot of the rock, and throw into it the leaves of a species of *cassia*, which emit a smoke so acrid that nothing can endure it—even the bees are forced to retire. As soon as the smoke subsides, a man is quickly lowered by a rope from the top of the rock; he knocks off the nest, and is immediately drawn up again, for, were he to make any delay, the bees would return, and their stinging is so dreadful as to endanger life.

In a tour which Colonel Travers made through a part of Ceylon, he found a species of bees which might at first be mistaken for black flies. Their heads, compared with their bodies, are extremely large. The honey is very liquid, and has a disagreeable flavour. I asked him if he had ever seen the honey-bird or Indicator, when he was at the Cape? he did see it,—and heard its shrill note of *cherr, che*, which announces the discovery of a bees' nest. He followed this sagacious bird along with a party of bee-hunters, and it soon pointed out a bees' nest, by redoubling the frequen-

of its cries, and by hovering over the place. Having taken most of the honey, they left only a small portion for their little guide, so that not having enough to satisfy him, he immediately flew off to find more. These birds construct very singular nests: they are composed of slender filaments of bark, woven together in the form of a bottle; the neck and opening hang downwards, and a string is loosely fastened across the opening on which they perch.

Colonel Travers told us that the skin of these birds is so extremely thick, that it can scarcely be pierced by a pin; and the bees therefore attack them by endeavouring to sting their eyes.

18th.—Colonel Travers was describing to-day the areca or betel-nut palm. The berry of this tree is, you know, constantly used by the Indians, who chew it both green and dry.

The preservation of the fruit during the rainy season, and the cutting it down when ripe, require much expertness and agility. He says, that from the middle of winter to the middle of spring, the leaves fall off: each leaf is attached to a broad leathern petiole or leaf-stalk; and these membranes, which are about three feet long, and half that breadth, are preserved for the rainy season as covers for the young bunches of fruit. This business is performed by a particular set of people, for the stem of the tree, which is about fifty feet high, straight, smooth, and without branches, like most of the palm tribe, is very difficult to ascend. Round his ancles, and under the soles of his feet, the climber fixes a rope; his feet, thus bound together, he places against the stem, and while he holds on steadily with his hands, he gently draws up his feet. He thus moves one hand forward and then the other hand, and afterwards again draws up his feet. In this manner he slowly reaches the top of the tree, where he makes fast a rope, the end of it being tied to the middle of a short stick on which he seats himself and performs his work, drawing up whatever he wants from below by means of a line hanging from his yirdle. When he has covered all the fruit, he unties his seat, secures it round his neck and swings the tree backwards and forwards, till he can reach another tree, upon which he throws himself and again makes fast his seat. In his way he swings from tree to tree, and covers or cuts the fruit in the whole garden without once descending to the ground.

19/h.—I hear such quantities of amusing things from this East Indian friend of my uncle's, that I scarcely know how to select from them. I wish you were here to listen to his adventures and to see his beautiful drawings. He lent me a sketch of the famous talipot tree of Ceylon, which I have been trying to copy. What a magnificent object it appears, crowned at the top by those immense leaves, one of which, it is said, can shelter fifteen or twenty men from the rain! They seem to be formed purposely for this use, for they fold up like a fan, so that the whole leaf, or any portion of it, becomes portable; and though tough and impenetrable to water, they are easily cut with a knife. When a leaf is spread out, it is nearly circular; but it is cut for use into triangular pieces, one of which every Singhalese soldier carries as his parasol or umbrella by day, and his tent at night. The fruit is not eaten, but the pith, like that of the sago tree, is very good, if the tree be cut down before the seed ripens, when beaten in a mortar it produces a kind of flour, from which cakes are made, that taste something like wheaten bread.

Colonel Travers made an excursion into the interior of Ceylon, and he described to us to-day a very curious mode of hunting which they have there. Near the side of a large pond, a hole is dug four feet deep, and wide enough to contain two or three persons. It is covered with leaves, branches, and earth, except a small opening, through which the hunters can keep a look-out, and when necessary point their guns. Before dark, they conceal themselves there, in order to watch the wild beasts, which come from the woods to drink, and the different species of which always come in separate herds. The elephants come first and stay longest, as they usually bathe before they drink, and when the water is not deep enough, they draw it up into their trunks and refresh themselves by spouting it over their bodies. The buffaloes come next; after having satisfied their thirst, they amuse themselves by lying down in the water, and playing and tumbling about. The tigers and the bears take their separate turns; and towards morning, the w boars and deer, and other smaller beasts. It is for th that the hunters generally adopt this plan, which, howev is exposed to more dangers than one, for there are instan of elephants falling into the pits and crushing the peop and even of tigers and buffaloes having discovered them

their scent. To avoid such misfortunes, the hunters go in parties, and one person is placed in some secure position, to warn the others and to frighten away the straggling animals that come too near, by firing upon them or throwing rockets. Colonel Travers and his companions joined a party of this kind, and here is his history of it.

'We were called at two o'clock, and having carefully loaded our pieces and filled our pouches with cartridges, we slowly advanced along the river. At a distance on the other side, the noise of various animals was echoed deep and terrible through the forest; and we heard in almost every watery place around us rustling and motion. We pitched upon one of the largest of these places, and crept softly, but at a little distance from each other into the bushes and thorns with which it was surrounded. This pool seemed to be about five or six hundred yards in circumference, and we all agreed not to fire at an elephant, or at any of the large fierce beasts, but to wait patiently the arrival of the smaller animals.

'We had not been long concealed in our thorny hiding place, when two tigers approached at the opposite side, and we observed that they drank one after the other, though there was sufficient space for both. Another half hour elapsed before any thing more made its appearance, but the noise increased on all sides, and made us rather uneasy. At last we heard the deep low of approaching buffaloes, and three soon made their appearance. After having drunk for a long time, they waded into the deep part and lay down, so that nothing could be seen but their noses; and no one, who had not seen them go in, could have suspected that such huge animals were concealed there. In a short time a fourth buffalo arrived, and after snuffing round him for some moments, he began to drink. Though the others put their heads out of the water, they did not interfere with him while drinking, but when he appeared inclined to advance farther into the water, one of them instantly attacked him with a hideous roar, and as the moon shone very brightly, I could see distinctly the hole of their furious battle. At every charge they retired some steps backwards, making the sand fly in clouds, and then, with dreadful snortings, and at full speed, again rushed upon each other. At last the intruding buffalo received such a tremendous blow, that he fled; and the conqueror,

disdaining to pursue him, merely bellowed twice, with a clear and terrific sound that re-echoed on every side, when he quietly returned to his companions.

'The pleasure I had felt in beholding this furious combat was soon changed into alarm, by the unexpected report of a gun! The three buffaloes started suddenly from the water—for a few moments they stood together snorting with rage, and then two of them rushed off in the direction of the flash, while the third came out near me, as if to search the bushes on all sides. I endeavoured to get out of my bush before the monster could approach, but unfortunately I became entangled in the thorns, and it was impossible to extricate myself in time. By a violent effort, however, I tore myself loose, leaving most of my clothes behind, and instantly began to run—but the furious beast was now close—I almost felt his breath, and looking round saw him not six paces distant, when throwing myself flat on the ground, he passed over me and continued at full speed! I again crept into the thicket, and in a few minutes I heard the voices of my companions, who were in search of me, armed with flaming pieces of wood. I had felt much incensed against them for firing—but I found that they had not been to blame, a branch had struck the lock of one of their guns, which went off, and they had been exposed to as much danger as myself.'

WEEK 16.

On the Hardening of Pharaoh's Heart—Effect of Salt on Worms—The Fall of Leaves—Winter Corn—Potatoes—Malcolm's Plum—Kitchen Garden—Recovery of Bertram—Circle round the Fire—Arithmetical Questions.

Nov. 20th.—*Sunday*. 'And he hardened Pharaoh's heart, that he hearkened not unto them, as the Lord had said.*' My uncle told us to-day that this passage should be expressed thus:—'And the heart of Pharaoh *was hardened*, so that he hearkened not unto them; as the Lord had *foretold*.' It is so rendered, he says, in the ancient versions, and most judicious modern commentators agree that this is proper meaning.

'Indeed,' said my uncle, 'in allowing it to be infer

* Exodus vii. 13.

that the Lord had purposely hardened Pharaoh's heart, the translators of the Bible have acted inconsistently with their own view of the phrase in several other places.* This is very striking in the following chapter, where it is said, "Pharaoh hardened his heart at this time also," which plainly implies that his resistance after the former plagues had proceeded from his own perverse and stubborn disposition. I have likewise been assured by some very learned men, that, according to the Hebrew idiom, verbs active often signify *permission*; and in these verses it is much more consonant to our ideas of divine justice so to understand the expression: that is, that God permitted Pharaoh to proceed in his own proud and wicked career insensible to the threatened judgments which he had already despised.

'But even supposing that the verb is to be taken in the active sense, it is a remarkable fact, that the event was constantly suspended in order that Pharaoh might have it in his power to relent and to "set his heart," that is, to humble and change it, and become obedient to the word of the Lord; for after five plagues had already been wrought upon him, and that he still persisted, even then his punishment was withheld, in order to let him repent, if he would. Besides which, the delay afforded a far more conspicuous testimony of God's patience, and gave greater dignity to his wrath.

'Pharaoh's final obduracy therefore was not caused by God's will, but was the effect of his own previous obstinacy;—that he hardened his heart was his sin;—that the Lord permitted him to harden it was his punishment.'

My uncle said also, that a Hebrew scholar told him, that the word which is translated by the verb to *harden* in the above text is, in other parts of the Bible, translated to *grieve* or to *trouble*; and that, in his opinion, the construction of the sentence requires one of those words.

'In several parts of the English Bible,' continued my uncle, '*shall* is put in the place of *will*. For instance, in Exodus ix. 4, "And the Lord shall sever between the cattle," where the sense evidently requires *will*; and thus ch. vii. 1, and ix. 9, "Pharaoh shall not hearken unto you," should undoubtedly be rendered "Pharaoh *will* not hearken unto you." This agrees exactly with the principle I have

* Exodus vii. 22, viii. 19 & 32, ix. 7.

already mentioned, that verbs active sometimes signify permission.'

My uncle mentioned several other instances of this confusion between *shall*, which seems to ordain, and *will*, which only foretels. And he added, 'There are several of these minor faults and mistakes in our translation, which make it very important that we should never judge of detached passages, but that we should compare different parts of the Bible together, in order that they may throw light upon each other.'

21st.—I forgot to tell you in the right part of my journal, that in preparing my carnation beds, the gardener observed a great number of those wire-worms which are so destructive to all the pink tribe. I recollected that Mr. Biggs said that salt destroyed them, but that it was difficult to apply just the right proportion; that is, enough to kill the worms, but not enough to render the ground sterile—which a great quantity of salt certainly does. In talking of this to my uncle, it occurred to him that the stuff called salt dross, which is often thrown away, would be a mild form of applying salt; and he was so kind and indulgent, that he procured, not without much trouble and difficulty, a boat-load; it is of an odd purplish brown colour, and retains many saline particles.

To each of my intended carnation beds, which are about six feet long, and two feet broad, we put a wheelbarrow-full of this stuff, which the gardener dug in and thoroughly mixed with the earth. The beds were then thrown up in high ridges to remain so for the winter, during which the salt will, my uncle thinks, destroy these mischievous worms as well as the snail eggs.

If this succeeds, it will be a very satisfactory experiment, but many months must pass before we can ascertain its success.

This was done a few days before my uncle went to town.

22nd.—I have had another walk with my uncle to-day, in the beech-walk, of which he has made me so fond. I took that opportunity of asking him why some trees lose the leaves in winter and others preserve them; for the fall the leaf has been a subject of great curiosity to me, and felt quite sure that he could explain the cause clearly. He told me that it has never been satisfactorily accounted for, and that there is some objection to every opinion

published. He says it would be a very good pursuit for my cousins and myself, to begin a course of observations on the nature of leaves and leaf-buds, and their connexion with the stem; and he has offered a prize, as he says they do in the learned societies, to whichever amongst us takes the best view of the subject.

I asked, was it not caused by frost? 'It is not always the effect of autumnal frost,' he replied. 'Some trees seem to lose their leaves at stated times, independently of the temperature. They fall from the lime, for instance, before any frost happens; and indeed all deciduous leaves, as the season advances, become gradually more rigid, less juicy, lose their down, and at last change their healthy green colour to a yellow or reddish hue.'

He then asked me if I had observed anything of the order in which the different trees cast them. I answered that the walnut and horse-chesnut appeared to have lost their leaves before any other: then the sycamore and lime, and I believed the ash had soon followed; but that many of the elm, and most of the beech and oak trees were still well covered, though they had changed colour.

'Yes,' said he, 'but the leaves of the young beech, though they have become brown and dry, will not fall till spring; and the fibres of the oak are so tough, that the leaf does not easily separate from the branch. You may also perceive that the apple and peach trees remain green, very often till the beginning of December. Some botanists attribute the defoliation of trees to the drying up of the vessels which connect the leaf with the stem; and others to the swelling of the young buds for the succeeding year. This, they say, deprives the old leaf of its accustomed supply of sap, and as they enlarge they push it out of their way; but there is a material objection to this theory, that the leaflets of *pinnated* leaves fall in the same manner, though there are no buds to push them off.

'It is also supposed that the vessels of the petiole gradually become woody, and incapable of freely transmitting the sap; it therefore stagnates, the vessels become overloaded, and the parts which connect the stem and the leaf crack at the insertion of the petiole. The vessels being thus interrupted, the leaf is no longer supplied with proper nourishment, it loses its elasticity and becomes dry and

brittle; and the least shock, whether the effect of frost or of wind, detaches it.

'Another opinion,' added my uncle, 'is, that the fibres of the leaf-stalk are not a simple continuation of those of the twig or branch, but that they both terminate at that point from which the leaf falls; being only connected by a kind of adhesive substance which dries up when the sap ceases to rise. This point of separation you may easily perceive,' said he, 'like a cicatrice, in the form of a ring; and the same appearance of a natural separation is to be seen in the peduncles of flowers, which seem also to be attached by a sort of vegetable solder to the stem.'

'But, uncle, why then do not leaves fall much sooner, if they are so slightly attached to the stem?'

'Because this adhesive substance is a strong cement, as long as it is supplied by the vegetable juices. If you attempt to remove the stalk elsewhere than at that point where it is united, the fibres are lacerated, and this proves that the separation had been prepared for at that one point, by some peculiar organization which acts independently of frost or rain, or other external causes.'

My uncle then showed me the ring which marks the point of separation. It is most easily seen in autumn, he says; it is double in the orange, and in the berberry he showed me that it is above the point of contact between the leaf and branch, so that after the fall of the leaf, the rudiment of the foot-stalk remains to preserve the bud. He took the trouble of pointing out a little triangle of thorns behind the young bud, which seems to be another beautiful contrivance of nature for its protection in that bush. We then observed this point of separation in other trees whose leaves were not at all gone, and he told me that it is very strongly marked in the horse-chesnut with five small dots.

I begged my uncle to tell me what I should particularly pay attention to in the course of our observations.

He said that as it has never yet been ascertained whether the leaves spring from the wood or from the bark, he would advise us not merely to observe the progress of the buds, but to take every means of tracing their connexion with the interior. We may examine with his microscope all sorts of twigs, to see whether the vessels of the central part of the wood extend to the leaf-stalk; and he suggests that we

should very carefully observe the difference of structure in evergreen leaves, and in those which perish in the autumn. He recommends us to lose no further time in beginning our task on the few remaining leaves, in order that we may see in spring whether evergreens shed their leaves in the same manner; and we are also to ascertain when their buds are actually formed. 'Above all,' he says, 'I advise you to take nothing for granted—examine everything with your own eyes, and learn facts.'

I shall like this employment very much, and Mary, Frederick, and myself have agreed to work in concert. Both my uncle and aunt encourage us, they say it will afford an opportunity for very entertaining experiments, and they think that inquiries of this sort are highly useful to young people.

23rd.—The fields which were ploughed and sown with wheat not above two months ago, are now of a beautiful green; how hardy it must be, to withstand the severe weather, which I am told may soon be expected! My uncle says, that wheat grows in every variety of climate, except in regions of extreme cold.

It has not been ascertained of what country wheat was a native, and it is certainly a very remarkable fact, that, though cultivated so generally, no wild plants of those species that are used in agriculture have been found, though one of our late travellers imagined that he found it in the mountains of Thibet.

The ploughs are still at work preparing the ground for oats to be sown in spring, or they are laying it up in fallows. The potatoes have all been dug long ago, and safely packed in houses, to preserve them from the frost, which spoils them. My uncle says, that though potatoes are more used than formerly, they are not such a general article of food as in Ireland. The custom there is to store them in pits covered with a high mound of clay, which by excluding the air, delays the progress of vegetation in the root, until the time of replanting returns.

'It is quite astonishing,' my aunt remarked last night, 'how the cultivation of potatoes has spread since they were first discovered in South America, and imported by the Spaniards, who called them *papas*. Sir Walter Raleigh found them afterwards in Virginia; he introduced them into this country in 1596, and there is now scarcely a civilized

spot on the earth to which we have not distributed them. Even to Persia, this valuable root has been conveyed by the benevolent exertions of our envoy, Sir John Malcolm; and at Abusheher the grateful inhabitants call it Malcolm's plum.

I have been very busy this morning clearing away all dead stalks and leaves in my garden, and completing the borders, which I have edged with thrift; and all my seed-beds have been lightly covered to preserve them from the expected frost.

The gardener is going to try two new methods of raising pine-apples; for my uncle always likes to ascertain truth by experiment. A great pit is to be filled with withered leaves, which in decaying undergo a fermentation that produces sufficient heat to answer the purpose; and in this pit the pots of pine plants are to be plunged. The second method is to place the pine-pots on a brick stand, in a moderate heat, and without being plunged in either tan or leaves. He is a most valuable gardener, and finds time for many nice little experiments, without ever neglecting his regular work. All his carrot, parsnip, and beet roots are taken up, and preserved in dry sand; he is now sowing celery under glass frames, for an early crop for next year; and Mary says they have had celery every day since July, in continual succession, as he constantly earthed it up, adding still to the height of the earthing, in order to increase its size and whiteness. His peas and beans he sowed three weeks ago, in the warm border in front of the south fruit-wall. He is now going to protect them from frost by branches of fir-trees, and he hopes to have some ready for the table by the second week in May.

What a contrast there is between the labour and attention necessary here for all these vegetable productions, and the luxuriance with which they spring up in Brazil! But there is a pleasure, I am sure, in successful industry, that is scarcely understood by the indolent inhabitants of those warm and fertile climates.

25th.—Yesterday, being a bright lovely day, my uncle and aunt took advantage of it to go to Newnham to see the poor travellers, of whom we had heard nothing for some time.

Beyond all our hopes, they found Bertram considerably better. My aunt had requested her own physician to attend

him, and he is now so much recovered, that if the weather continue mild, he is to set out to-morrow on his way home. The old gentleman arrived last week, and though great agitation was caused at first by their meeting, yet it seemed to have a favourable effect on Bertram, as the anxiety and fear of never seeing his poor old father again had preyed on his mind.

Madeleine's spirits are a little improved, she allows herself once more to hope, but she is prepared to submit with true Christian resignation to whatever happens. She is relieved too from all anxiety in regard to her new father; he received her as a daughter, and expresses the greatest tenderness for her and her pretty little child; who has learned to say 'dear grandpapa' among the few English words she has picked up.

When my aunt went in, she found him just going to read prayers to his son; she begged of him to go on, and she says nothing could be more touching than the scene—the weak but solemn voice of the pious old man, the calmness and devotion in the countenance of the son, and the gleam of hope that shone over Madeleine's subdued and sad countenances.

26th.—Now that winter has really begun, we make a circle round the fire after dinner; and we are so comfortable and happy there, that I am often sorry when the time comes for leaving the room.

We have various amusements; on some days we each invent little tales which are to turn on some circumstance that is first agreed upon; at other times, we have some of those question plays, in which you discover, by a particular set of questions, the thoughts of another person. One of our favourite occupations is doing arithmetical questions in our heads. We have often used a multiplier of three or four figures, which, I assure you, makes it hard work. My uncle and aunt now and then join in this, and being of course very ambitious to outdo them, we all get into a sort of fever of exertion, which makes it very diverting, and the conqueror very triumphant. Then we compare the different methods which we took, and each person finds out what caused their mistakes. I am afraid I am oftener behind in the race than most of the party; for beside their being much better arithmeticians than I am, I am so afraid of being wrong, that I do not speak out in time, even when I have my answer ready and right.

I must tell you one of the questions we had this evening, it was proposed by Caroline. In one of the vignettes to Bewick's birds, there is a man preparing to fasten himself to a team of birds, which are to convey him to the moon; the team is wedge-shaped, and the birds are harnessed together in rows, each of which increases by one, from the single bird that acts as leader. Now, supposing that the man weighs ten stone, and that each bird can raise five pounds, how many rows of birds are necessary for his flight?

WEEK 17.

On the Judgments inflicted on the Egyptians—Locusts eaten in the East—Swift, Denham—Influence of Circumstances on Haydn—Flight of Locusts at Smyrna—Pepper Vine—Anecdote of Davy, a Musician.

Nov. 27th.—Sunday. My uncle again took up the judgments inflicted on the Egyptians. He said, that if they were considered with reference to that particular nation, it appeared that there was a peculiar meaning in some of those calamities, which would not have applied so well to any other people. He told us that they paid an idolatrous reverence to many of the inferior animals, and worshipped, as superior gods, the ox, the cow, and the ram. Among these, the Apis and Mnevis are well known; the former, a sacred bull, adored at Memphis, and the latter at Heliopolis. There were also a cow and heifer, which had similar honours at Momemphis. These judgments were therefore very significant in their execution and object: as the Egyptians not only saw their cattle perish, but, what was still more dreadful, they saw their deities sink before the 'God of the Hebrews.' This satisfactorily explains what is said in Numbers: 'Upon their gods also the Lord executed judgments!'^{*} and these events had doubtless a useful influence, though not a lasting one, on the minds of the Israelites, to whom the gods of the Egyptians must at that time have appeared very contemptible.

'I will cause it to rain a very grievous hail:' this judgment, he told us, was also particularly adapted to the Egyptians. The rain and hail that were foretold must have ap-

* Numbers xxxiii 4

peared, of all things, most incredible to the Egyptians; for in Egypt little or no rain ever falls, the want of it being supplied by dews and by the overflowing of the Nile; and when they witnessed this storm of hail, 'such as had not been in Egypt since the foundation thereof,' and accompanied by 'mighty thunderings,' and fire that ran along the ground, what dread and amazement they must have felt! Pharaoh had received warning of these terrific prodigies, which the deities of Egypt could not avert; and even the fire and water which had been held sacred by the Egyptians, were now employed, they found, as passive instruments of their punishment. Besides the formation of the hail, which was so uncommon in that country, its falling so miraculously on the day and in the district foretold, must have overwhelmingly convinced them of the impotence of the creatures which they worshipped, and of the boundless power of the Almighty.

I asked my uncle at what season these plagues had happened, and why the injury to flax and barley were particularly mentioned.

'The season,' said he, 'is not expressly stated; but as the departure of the Israelites was on the 15th of the month of Abib, which corresponds with the beginning of April, we may suppose that the seventh plague (of hail) was sent about the beginning of March, so as to leave time for the three succeeding plagues. This idea is confirmed by travellers, from whom we learn that the barley harvest in Egypt is reaped in March, and the wheat in April; and it explains why "the barley was in ear," though not yet fit for reaping; and "the wheat and the rye were not grown up." Abib means the month of the young ears of corn.

'Their barley must have been a grievous loss, as the principal beverage of the Egyptians was made from it; but scarcely anything could have distressed them more than the loss of their flax, because the whole nation wore linen garments, and the priests never put on any other kind of clothing. This linen was manufactured from that fine flax for which the valley of the Nile was famous, and was in great request in other countries also; for though the Egyptians did not trade abroad themselves, yet they readily disposed of it to foreign merchants.

28th.—A question of mine, this morning, though it exposed my ignorance, gave me an opportunity of perceiving

how much light is thrown by general knowledge on the difficult parts of Scripture history; and, indeed, on all other history. I had asked how it was that the locusts, independently of their coming at the appointed moment, could have been called one of the miraculous plagues, as they were so common in Egypt. I saw my cousins looking a little surprised, but they are so good-natured that they never laugh at my mistakes.

My uncle explained to me that I was wrong in supposing that locusts were common in Egypt. 'They are very abundant,' he said, 'in the neighbouring regions of Arabia, which has been proverbially called their cradle, but the Red Sea appears to be an effectual barrier against their molesting the Egyptians. They seldom succeed in crossing any great extent of water; for though they frequently migrate into very distant countries, yet their habit of often alighting on the ground is fatal to them in traversing the sea.'

'There is another circumstance that saves Egypt from the visits of these dreadful insects: when they take wing they are obliged to follow the course of the wind, and in that country, you know, the winds blow six months from the *north*, and six months from the *south*; but at the time spoken of, an east wind prevailed "all day and all night;" and the whole face of the country in the morning was covered with the locusts. This strong easterly wind, which enabled them to cross the Red Sea, was plainly preternatural; and we are told distinctly that "before them there were no such locusts as they, neither after them shall be such."

'There are in Scripture ten names for locusts. The species mentioned here, is called *Arbah*, which imports multiplicity; a very just name, indeed—for their prodigious numbers almost defy calculation; and the famous Dutch naturalist *Leuwenhoek* asserts, that every female lays upwards of eighty eggs. When a cloud of these insects alights upon the ground, the devastation they create is dreadful. *Adanson*, in his voyage to the western coast of Africa, says, that they devoured to the very root and bark; and that there was something corrosive in their bite, which prevented the trees from recovering their power of vegetation for some time. They even attacked the dry reeds with which the huts were thatched. Another traveller tells us that in Cyprus, as he went from Larnica to a garden at about four

miles' distance, the locusts lay above a foot deep on several parts of the high roads, and millions were destroyed by the wheels of the carriage. Dr. Shaw says, that he saw them in such multitudes in Barbary, in the middle of April, that in the heat of the day, when they formed themselves into large bodies, they appeared like a succession of clouds darkening the sun: in June the new broods made their appearance: on being hatched, they collected together in compact bodies of several hundred yards square, and marching directly forward, climbed over trees, walls, and houses, ate up every plant in their way, and let nothing escape. The inhabitants made trenches and filled them with water; they also placed quantities of combustible matter in rows and set them on fire; but in vain, for the trenches were quickly filled up and the fires extinguished by the vast numbers that succeeded each other.

'Strong winds, which can alone free a country from this plague, have several times blown large swarms over the central part of Europe, and even to England; and it was a "mighty west wind," which formerly carried them away from Egypt and cast them into the Red Sea.' I asked if these insects were really eatable, as St. John is said to have lived on locusts in the wilderness.

'As it is well known,' said my uncle, 'that locusts have in all ages been eaten in the East, and are still esteemed a great delicacy in Barbary, as well as in the south of Africa, some commentators have endeavoured to prove that St. John did eat them in the wilderness. But the word translated locusts signifies also *Pods* or seed-vessels of trees. The pods of some of the Robinia and Gleditsia tribes are considered in Syria to be sweet and nourishing; and it is, I believe, generally supposed that they were the food alluded to in the Gospels.

29th.—In our genius conversation to-day, several people were mentioned on each side: Mary quoted a passage from Johnson's Lives of the Poets, respecting Denham, who, he says, was 'considered at Oxford as a dreaming young man, given more to cards and dice than to study;—he gave no prognostics of his future eminence, nor was suspected to conceal, under sluggishness and idleness, a genius born to improve the literature of his country.' 'Of Swift, too,' continued Mary, 'there appears no early proof of genius or diligence; for when at the usual time he claimed a bachelor-

ship of arts, he was found by the examiners too conspicuously deficient for regular admission—and at last obtained his degree by special favour; a term used, as Johnson says, in the university of Dublin, to denote want of merit.' It is probable, therefore, that new circumstances combined together afterwards, to *bring out* the powers possessed by these celebrated men; and I am sure, Mamma, this little perpetual argument serves to bring out several very entertaining biographical facts.

Haydn, the famous composer, was the son of a wheelwright; such an employment was not likely to lead to the cultivation of music, and we might be tempted to consider him as a natural genius; but it appears that his father played on the harp, and on holidays used to accompany his wife while she sang. Whenever this little domestic concert took place, the child with two pieces of wood in his hands, to represent a violin and a bow, pretended also to accompany his mother's voice; and to the very close of his life, this great musician used to perform with delight the airs which she had then sung. A cousin of theirs, a schoolmaster, came to see them, and being well pleased with the boy's talents, proposed to educate him. His parents accepted the offer; while at school, having discovered a tambourine, an instrument which has but two tones, he succeeded in producing a kind of air, which attracted the attention of all who came to the school-house. He was then taught to sing at the parish desk, and was soon noticed by Reüter, who tried him with a difficult shake, and who was so delighted with the child's execution, that he emptied a plate of cherries into his pocket. He was eight when admitted to the choir of St. Stephen at Vienna, and from that time practised above sixteen hours a day. 'In all this,' says Mary, 'we see the natural effect of circumstances, and no mark of what is called absolute genius.'

30th.—Colonel Travers was not present at our conversation about the locusts; but on its being alluded to this evening, he told us that he had once seen a flight of those creatures which contained such an incredible multitude, that nothing could have persuaded him of the fact, if he had not been an eye-witness to it himself.

Instead of going by sea to India, he went overland, that is through part of Turkey, Arabia, and Persia; and, in 1811, he happened to be at Smyrna, in Asia Minor, when

this extraordinary flight of locusts occurred. He says that for several days stragglers had been passing, but at last the main body came, and in such a dense column, as not indeed to obscure the sun, but to produce a curious quivering light. He thinks the lines in which they appeared to fly were about one foot asunder, and that locust followed locust at the distance of three feet. They came in a steady, undeviating direction from south to north, and continued to pass without any diminution of their numbers, for three successive days and nights. The breadth of this prodigious column was at least forty miles, for a messenger who had been despatched by the consul to the pasha of Sardis, passed through them all the way, both going and returning. Caroline immediately produced the map of Asia Minor, and we found that Sardis is fully that distance from Smyrna, and that its direction is just at right angles to the direction of their flight.

My uncle was greatly interested by the Colonel's account of this remarkable swarm, and proposed that we should endeavour to make some estimate of the number of locusts of which it consisted. We all took out our pencils, and went to work. In the first place, the breadth of the column was 40 miles, or 70,400 yards; and as their ranks were a foot apart, we have 211,200 for the number of locusts at each foot of elevation. Colonel T. was then examined as to the entire height; he thinks it must have been much above 300 yards, for, on looking upwards with his pocket telescope, he could see them like little specks glittering in the sun. We contented ourselves with the 300, and taking them also at a foot apart, there were of course 900 locusts in height, by which we multiplied the former number, and the product was 190,080,000. Now, Mamma, for the length of the column: he says there was a gentle breeze from the southward, with which, and their own velocity, he thinks that they were travelling at the rate of about seven miles in an hour, and that they succeeded each other at an average distance of three feet. In each mile, then, there were 1760, and in seven miles, 12,320, which, multiplied by 72, the number of hours in the three days which the flight continued, gives 887,040 for the number in each line of the column; and this, finally multiplied by the 190 millions, gives the almost inconceivable total of 168,608,563,200 000 in this one swarm of locusts!

Dec. 1st. Colonel Travers, who every day tells us something curious that he has seen in his travels, has been describing the cultivation of the pepper vine in the East Indies. In July, at the beginning of the rainy season, from eight to twelve shoots are planted round some tree chosen for their support: as they grow up they must be tied to its stem; and in dry or hot weather they are watered. They begin to bear in six years; in ten, they are in full perfection, and continue so for twenty years more, when they die. When the fruit is intended for *black* pepper, it is not allowed to ripen, but collected while green. As soon as the berries become hard and firm, which happens between the middle of December and the middle of January, they are pinched off by the fingers, placed on a mat, and rubbed by the hands or feet till the seeds, several of which are contained in each berry, are separated. These seeds are then spread on mats; and at night they are collected in earthen jars, to preserve them from the dew. Two or three days' exposure to the sun sufficiently dries them, when they are put up in bags, containing from 60 to 120 pounds, and are then considered fit for sale. When the berries are intended to produce *white* pepper, they are allowed to become perfectly ripe, in which state they are red. They are then well rubbed in a basket, and when the pulp is washed off, the seeds are white, and are immediately dried for sale. The vines, however, in this case are apt to die, and in the province of Malabar but little white pepper is now made.

A good plant produces about 32 pounds; this is the highest produce; 21 pounds is the average. The *mango* tree is preferred for supporting the pepper vine, as the fruit is not affected by it; but the fruit of the *jack* tree, which is also used for the purpose, is thought to be injured in flavour by the pepper being so near it.

The Colonel says, that the pepper plant is not a vine in reality, though the knotted stem, when dry, has much the appearance of a common grape vine. The leaf, too, is different, being pointed, and with deep veins in it, all meeting at the point.

2nd.—Caroline amused us after dinner with a singular anecdote of a musician of the name of Davy; though she was at first unwilling to relate it, as she could not remember her authority.

He was the son of a Devonshire farmer, and, when a little

boy, used to go continually to a neighbouring forge, where he seemed to be strangely interested in examining and sounding the horse-shoes.

After some time, the smith, having frequently missed his shoes, began to suspect young Davy of stealing them; the boy was, therefore, watched, and one day he was observed to have separated two shoes from a parcel which he had been sounding for a long time. He took them up and went quietly off, but was followed, and traced to a loft, where he had formed a hiding-place for himself, unknown to any of his family. There he was found arranging his newly stolen treasure among a number of other horse-shoes which he had suspended with iron wires, so as to form a sort of musical instrument, on which with a small hammer he could play several tunes; particularly one with variations, which he had often heard chimed in the parish steeple.

The generous blacksmith not only forbore from punishing him, but joined in a subscription, by means of which he was apprenticed to a famous musician.—So much for genius.

WEEK 18.

Institution of the Passover—Rice—Rose of Shiraz—Duck of Asia Minor—Guyton de Morveau—Change of early taste—Fish-catching in the Gulf of Patrasso.

Dec. 4th.—Sunday. My uncle read to us this morning the account in Exodus of the institution of the feast of the Passover. It took place in the beginning of the sacred or ecclesiastical year, in the month named *Abib*, which signifies, he says, an ear of corn; but this month was afterwards called *Nisan*, which means the ‘flight,’ in allusion to the escape of the Israelites. It was at this same season that our Lord suffered for our redemption; and it is a remarkable circumstance that there was always a tradition among the Jews, that as they were redeemed from Egypt on the 15th day of Nisan, so they should on the same day be redeemed from death by the Messiah.

My uncle then said, ‘many of the ceremonial laws of the Hebrews had a direct reference to the idolatrous opinions and rites of the neighbouring nations. For instance, some of the ordinances of the passover, which was, you know, a memorial of the deliverance of the Israelites, were strikingly in opposition to the most deep-rooted prejudices of the

Egyptians. Amongst that people, lambs and kids were held in the utmost veneration, and never sacrificed; but the Israelites were instructed to sacrifice both. The Israelites were desired to "eat no part raw," which might appear a very unnecessary injunction, did we not know that it was usual to do so in the heathen festivals, as we learn from Herodotus and from Plutarch, who both mention it as being customary at the feasts of Bacchus, which had their origin in Egypt. Of the Paschal lamb, "no bone was to be broken;" for on those occasions the heathens broke the bones, and pulled them asunder with frantic enthusiasm. Neither was it to be "sodden," as in their magical rites: but roasted by fire, and not by the heat of the sun, which was one of the chief objects of their idolatry. It was to be eaten along with "the purtenance," that is, the intestines, which the heathens reserved for their impious divinations. Lastly, "no fragments" were suffered to remain, because the superstitious multitude had been in the habit of preserving them for *charms*; and they were, therefore, ordered to be burned.

'The lamb or kid was to be slain in the evening; the Hebrew expression is literally "*between the two evenings*;"—for among the Jews there was an early and a later evening; the first beginning at noon, as soon as the sun began to decline, and the second at sunset, which at this season of the year, the vernal equinox, took place at six o'clock. Thus the time "*between the two evenings*," when the passover was slain, was about three o'clock in the afternoon; and this was the very time of the day when Christ, the true passover, was sacrificed on the cross.

'What a striking analogy there is,' continued my uncle, 'between that typical sacrifice of the Paschal lamb, and the grand sacrifice of Him who is called the "*Lamb of God* which taketh away the sins of the world;"—between the deliverance of the Israelites from bondage, and the deliverance of mankind from sin, by a final atonement, which for ever closed all other offerings and sacrifices.'

I asked why we were desired to eat unleavened bread at this feast; and my aunt told us that some authors suppose it was to remind them of the privations and hardships they had formerly endured in Egypt, as it is very heavy and disagreeable. 'But,' she added, 'I have also understood that in the ancient figurative mode of expression, *leaven* was the

emblem of hypocrisy and artifice ; and therefore that eating the passover with unleavened bread, implied the performance of the ceremony in sincerity and truth. They were commanded to eat it with "their shoes on their feet, and their staff in their hand," or in other words equipped for a journey. It appears to have been, and indeed is still, the universal custom of the inhabitants of the East to put off their shoes during their meals ; not only because that is a period of enjoyment and repose, but because, to people who sit cross-legged on the floor, shoes would be troublesome, and would soil their clothes and their carpets. This solemn meal, on the contrary, which was intended to commemorate their miraculous and abrupt deliverance from Egypt, was to be eaten by the Israelites in the dress and posture of travellers, as if ready for immediate departure.'

My uncle gave us an amusing instance of the punctilious regard that the Jews pay to the letter of the law ; which not only prohibits their eating leavened bread, but their having it at all in the house. In Exodus xiii. 7, it is written, 'Neither shall there be leaven seen with thee in all thy quarters.' On the eve of the passover, the master of the family, attended by all his children and servants, formally search every corner of the house with candles in their hands ; but why with candles ?—because in the prophet Zephaniah, i. 12, it is written, 'I will search Jerusalem with candles.'

'This feast,' continued my uncle, 'was called the Passover, because the destroying angel of God passed over the Israelites without smiting them ; and to pass over is a literal translation of the Hebrew word *pesach*. From whence also we have the expression of the Paschal Lamb.'

'The deliverance from Egyptian bondage was a specific type of our subsequent deliverance from the yoke of sin, which we commemorate in the sacrament of the Lord's Supper ; and it is remarkable, that both the Jewish and the Christian rite were enjoined as memorials of events which had not yet happened. To all mankind the privileges of this great second deliverance are offered ; and let us remember that, like the Israelites, we are but strangers and pilgrims here, hastening on to a *land of promise*.'

6th.—Mary asked Colonel Travers, to-day, why rice is called *paddy* in the East Indies. He told us, that the wet lands capable of being cultivated for rice, are called, in the

province of Malabar, *padda* land; and thence has the name paddy been given to the grain before the husk is beaten off. It is cultivated in all the low grounds which are periodically overflowed, or where the water can be regularly let in. Sometimes it is sown dry, on fields properly ploughed and moistened beforehand, and when the leaf is a certain height, the water is gently let into the furrows; but in many places it is sown very thickly, and afterwards transplanted. The general mode of preparing the seed is to steep it in water, and then to mix it up with earth in a shed, where it heats a little, and soon sprouts; when the shoot is nearly two inches long, it is carried in baskets to the field, and planted in rows.

The operation of cleaning rice is assisted by boiling for a short time; after which, it is beaten in a mortar, with a stick five or six feet long, the bottom of which is shod with iron. But the rice used by the higher class of Brahmins is not boiled, lest it should be in any way defiled: it is every morning cleaned dry by one of the family, the labour of which is very great, because the husk adheres so closely to the grain.

Paddy is often kept in small caves, called *hagay*, the entrance to each of which is by a very narrow passage. The roof, floor, and sides are lined with clean straw, and the cave is then completely filled.

Colonel Travers is just like my uncle, he is so ready to answer all our troublesome questions; and you may suppose that some of us ladies asked him about the ottar of roses. He says, that the rose from which that essential oil is made, grows only in the valley of Shiraz, where there are immense fields of it. The flower is small, and of a deep red, and quite a different species from the *rosa indica*. It does not thrive south of Shiraz, as the climate is too hot; and the plants which have been brought to Bombay have generally failed.

We have had several rainy days, on which it was impossible to walk out; though it seldom happens, my uncle says, in this climate, that there is not some part of the day quite fair.

The gravel walks here dry quickly; but nobody seems to care much about wet or dirt, their feet are so well defended from damp; and my aunt has provided me with all the comfortable preservatives from wet that my cousins

have, so I force myself to go out and to take long walks. Sometimes we visit the poor people, to whom a little sympathy and kindness seem to be a great comfort; and the school is so near the shrubbery, that, unless the rain is very heavy, Caroline contrives to go there every day.

When we are so much confined as we have been for the three last days, we take care to practise well at battledore and shuttlecock: yesterday evening I kept it up to three hundred. Sometimes four of us play at once without any confusion; and sometimes even my uncle joins us. My aunt encourages us to exercise ourselves with active plays; and if you and Marianne could peep at us, you would be amused at the vigour and emulation with which we perform 'Puss in the corner,' and 'Friar's ground,' or 'turn the blind-fold hero round and round.' After luncheon is generally the time for these 'laborious sports.' Grace, of course, delights in them, and my uncle and aunt seem fully to enjoy our glee and gaiety; for exercise and recreation, they say, should be mixed sufficiently with all our studious employments. You will smile when I confess, that, much as I like them now, I felt at first that these 'romps,' as I called them, were rather too childish; my aunt told me to do as I liked; but, as I found that I only appeared conceited by sitting still, I soon conquered these silly feelings.

I have nothing more to say, except that I have begun to read Rollin's Ancient History; for the purpose of comparing the sacred and profane parts, and because I have some idea of endeavouring to make an historical chart for myself, which shall combine those two objects.

7th.—Ducks were the subject of discussion this morning at breakfast. My aunt told us, that the Chinese, by whom great numbers are consumed, usually hatch them by artificial heat. The eggs are placed in boxes of sand, upon a brick hearth, which is kept at a proper degree of warmth, during the process; and the ducklings are fed with boiled rice, crabs, and crayfish for a fortnight. They are then supplied with an old *stepmother*, who leads them where they can find food; being first put into a boat, which is to be their constant habitation, and from which the whole flock, perhaps three or four hundred, go out to feed, and return at command.

The masters of the duck-boats row up and down the rivers, according to the opportunity of procuring food; and

these birds obey them in an extraordinary manner. Several thousands, belonging to different boats, may be seen feeding in the same place, yet on a signal, each flock will follow their leader to their respective boats, without a single stranger having intruded.

Colonel Travers told us, that in a description of the south coast of Asia Minor, which he had lately read, a duck of extraordinary beauty is mentioned. The plumage is white, with orange and dark glossy spots, which are large and distinct, and in the males extremely brilliant. They fly in pairs, and their cry is loud and incessant. These ducks chiefly inhabit the cliffs of an island, and are peculiar to that part of the shore; and the author adds, what Colonel Travers considers to be a very singular fact—that although the whole coast lies in nearly the same parallel of latitude, yet several species of the feathered race seem to be confined to particular districts. For instance, at the western end, there were multitudes of the red-legged partridge; the middle of the coast was occupied by crows, and every hole and crevice in every rock had its family of pigeons; then came the ducks; and when they disappeared, the elevated cliffs seemed to be usurped by eagles. As he advanced still further to the eastward, even the common gull, which is so plentiful everywhere else, became scarce, but its place was filled by swarms of the noisy sea-mew; and at the furthest extremity of the coast, he entered a shallow bay, which was covered with swans, geese, and pelicans.

8th.—Mary was quite triumphant to-day in our genius argument, and produced two examples on her side, which she said were very strong.

The celebrated Dolomieu, she told us, entered very early in life into the religious order of Malta; but having unfortunately resented some insult, and killed his adversary, he was condemned to die, it being contrary to the rules of the order to use arms against any one but an 'enemy of the faith.' The grand-master, however, pardoned him; but the pardon not being immediately confirmed by the pope, he continued in captivity nine months before he was released. By this time, Dolomieu had become, as it were, a new man; the solitude and silence of his prison, and the necessity of dispelling his inquietude by occupation, had given him a habit of deep meditation; and he determined to devote the rest of his life to the acquirement of knowledge. He hesi-

tated for some time between classical literature and natural history; but, at length, decided for natural history, in which he afterwards made so conspicuous a figure.

It cannot be denied, Mary says, that this is a proof that the mind may be led by circumstances to any pursuit. She then gave us some anecdotes of Baron Guyton de Morveau, as being still more favourable to her system.

'Guyton's education was not neglected in the common routine of classical and theoretical learning; but his father, who had a passion for building, employed various artificers about his house, and young Guyton insensibly caught a taste for mechanics. This, which might have been considered as a natural inclination, was merely the effect of example; and it was further excited by a circumstance that happened during his vacation. At a public sale in the neighbourhood, an old clock had remained unsold, owing to its bad condition, and he persuaded his father to give six francs for it. The ardent boy soon took it to pieces, and cleaned it; he even added some parts that were wanting, and put the whole in order without assistance. In 1799, that is, fifty-four years afterwards, this clock was purchased at a higher price than was given for the estate and house together where it had originally been sold; having, during the whole of that time, preserved its movement in the most satisfactory manner. He once undertook the same operation for his mother's watch, and succeeded perfectly, though he was then only eight years of age. These details are sufficient to show how impossible it is to predict, from the whims of childhood, the vocation likely to engage any individual at a more advanced period of life. This little boy appeared to have a genius for mechanics, in consequence of circumstances attending his infancy—but no one has shown less taste for mechanics than Guyton de Morveau, during his long and brilliant career as a chemical philosopher.'

9th.—My uncle told us, to-day, a curious mode of catching fish by diving, which is practised in the Gulf of Patrasso, in Greece, and which is, he believes, peculiar to that place.

The diver, being provided with a rope made of a species of long grass, moves his boat where he perceives there is a rocky bottom; this done, he throws the rope out so as to form a tolerably large circle; and such is the timid nature of the fish, that instead of rushing away, they never attempt

to pass this imaginary barrier, which acts as a sort of talisman; they only descend to the bottom, and endeavour to conceal themselves amongst the rocks. After waiting a few moments till the charm has taken effect, the diver plunges in, and generally returns with several fine fish. As he seldom finds more than their heads concealed, there is the less difficulty in taking his prizes; and these divers are so dexterous, that they have a method of securing four or five fish under each arm, beside what they can carry in their hands.

The effect of the circle formed by the rope reminded Frederick of the singular manner in which pelicans and cormorants catch fish in concert with each other. They spread into a large circle at some distance from land; the pelicans flapping on the surface of the water with their great wings, and the cormorants diving beneath, till the fish contained within the circle are driven before them towards the land. As the circle becomes contracted, by the birds drawing closer together, the fish are at length brought within a narrow compass, where their pursuers find no difficulty in securing them.

One species of cormorant is so docile, Frederick added, that they are trained by the Chinese to fish for their masters. Sir George Staunton saw several boats with a dozen of these birds in each; at a signal they plunged into the water, and quickly returned with a prize in their mouths, which they never attempted to swallow without permission.

My aunt said, that those birds were formerly kept in this country for the same purpose; but the English cormorants were not so tractable, for a thong was tied round their neck to prevent their eating the fish. Charles the First, she says, had his master of cormorants as well as his falconers.

WEEK 19.

On comparing Passages of Scripture—Harpooning—Ceylonese Tale—Shakspeare's Tempest—Ariel and Puck—Mozart's early genius—His death.

Dec. 11th.—Sunday. My uncle, this morning, repeated his advice, never to allow ourselves to judge of detached phrases or single texts in the Bible, without carefully comparing them with similar passages in other parts; and he

added, that it was very unjust to charge the Bible with the errors of its translators, or to ascribe the mistakes and inconsistencies of human learning to the inspired original. 'The wonder is,' he says, 'not that there are some mistakes, but that there are not many more, and that of those there should be so few of importance. It is, however, the duty of everybody to make known those errors, slight as they are, and to try to remove all blemishes from a work of such high importance as a correct translation in our own language. Words have now a much more definite meaning than they had a few centuries ago; and some words may then have fairly conveyed the original sense, which is now greatly perverted by their continuance.'

'For instance, in Exodus iii. 22, it appears, that every woman is enjoined to *borrow* of her neighbour valuable jewels and raiment, and then to keep possession of them. But children,' said he, 'should be taught that the Hebrew word, which our translators have rendered *borrow*, signifies to ask as a *gift*. It is the very word used in Psalm ii. 8,—“Ask of me, and I shall give thee the heathen for thine inheritance;” and the fact was this: God told Moses that the Israelites should not go out of Egypt empty, but that every woman should ask her neighbour for certain valuable presents, and that He would dispose the Egyptians to give them. And all this seems to have been perfectly just, when you consider the slavery that the Israelites had been obliged to endure, and the hardships which had been inflicted on them, not only by the king, but by the people, who “made their lives bitter with hard bondage.”

'Josephus, the Jewish historian, represents this transaction agreeably to the true sense of the sacred text. He says, “the Egyptians made gifts to the Hebrews; some in order to induce them to depart quickly, and others on account of their neighbourhood and friendship for them.”

'As an additional confirmation of this being the true meaning of the expression,' my uncle continued, 'we may recollect that the custom of giving, receiving, and even demanding presents is common to all parts of the East at this day; it is especially practised on the arrival or taking leave of strangers, and therefore may be well applied, in this case, to the departure of the Israelites. It seems to have been the same in all ages; for I need scarcely remind you of the “gold, and spices of very great store, and precious stones,”

that the Queen of Sheba gave to Solomon ; nor of the magnificent gifts he presented to her when she was going away, even "all her desire, whatsoever she *asked*, beside that which Solomon gave her of his royal bounty." Nor is this exchange of presents looked upon as any degradation to dignity, nor any mark of a rapacious meanness.

' I have been the more desirous to explain that passage, because, from the ambiguity of one word the Israelites have been accused of cheating the Egyptians ; and, what is of more consequence, it has been said that they were commanded to do so. But when the word is corrected, you see that these calumnies at once fall to the ground. And I would recommend you all to adopt a general rule in reading the Scriptures, of which I have found the benefit. Whenever you meet with any expression that seems to be inconsistent with the moral justice of God—pause—compare the different parts where the same, or a similar phrase, occurs, and before you come to a rash conclusion, study the acceptation that the words had at the period when the present version was made. If it requires a knowledge of the original language, apply to some learned person ; not so much to reason for you, as to furnish the data on which to satisfy yourselves. However bounded may be our notions of the qualities of the Deity, and though his attributes far transcend our conception, yet is certain that our ideas of justice must have been derived from principles implanted by Him ; and no decree of His can ever be contrary to that justice—for the nature of God is immutable : He is "the same yesterday, to day, and for ever."'

12th.—I am sure, Mamma, that you must feel very grateful to Colonel Travers for all the interesting things which I have picked up from him, and which I put in my Journal for your amusement. To-day there was a conversation about our fisheries, and he related two facts which I am in hopes will be quite new to you.

You know that the great cod fishery, which supplies almost all Europe with salt-fish, is on the sand-bank that extends from the island of Newfoundland. The water is from twenty to sixty fathoms in depth ; and when the Colonel was returning from Canada with his regiment, he persuaded the captain of the ship to stop for some hours on this bank, in order to catch cod for the soldiers. He saw a great many hooked with long lines and pulled up ; and he

observed, that when that was done very rapidly the air-bladder burst, and pushed part of the stomach out of the mouth. He explained to us that it is the air-bladder that enables fish to raise or lower themselves in the water, by taking in or letting out more or less air; but this they can only do gradually; and therefore when the air has been highly condensed at the bottom of the sea, by the pressure of fifty or sixty fathoms of water, it expands the bladder more quickly than the fish has the power of giving it vent. The air-bladder is *cured* or salted with the fish, and is then called the sound.

This led the conversation to the different depths which are inhabited by different classes of fish. My uncle told us that turbot, soles, and other flat fish, are not furnished with an air-bladder, because they never quit the bottom of the sea; and Colonel Travers, to prove that some fish are not intended to sink very far below the surface, mentioned the following curious circumstance. When a whale is attacked by the sword-fish, he immediately dives; and the sword-fish, not being calculated by Nature to bear the enormous pressure of the sea at very great depth, is obliged to withdraw his weapon—if he cannot speedily extricate it, he dies. My uncle said that this fact helped to explain the facility with which those great monsters are killed by our Greenland fishermen: when a whale is struck by a harpoon, he imagines it to be a sword-fish, and, as usual, dives; this he does with such velocity, that the harpooner is obliged to throw water on the part of the boat over which the harpoon-line runs, to prevent its taking fire; but the power of diving is probably limited even in a whale, and the length of line, perhaps a mile or two, which he has taken out and is obliged to drag through the water, at last tires him—he stops—and the men, by slowly pulling in the line, in fact haul the boat towards him: again he sets off—he is again tired—and is ultimately exhausted and killed by fatigue! If he ran straight out, near the surface, no line could be long enough, or strong enough, to check him—whenever a whale does so, the line snaps, and he escapes.

13th.—The last thing that Colonel Travers told us—for I am sorry to say he is gone away—was a pretty little story that he learned at Ceylon.

When the pearl-fishing in Condatchy Bay is going on, which is, he says, a most lively, amusing scene, the In

dians of the continent attend in great numbers, and being occasionally employed, they find ample opportunity to exercise their dexterity in sleight of hand and every sort of roguery. A set of these Indians contrived an ingenious method of cheating the boat-owner who employed them to open his oysters. While one of them made a preconcerted signal, whenever any pearls worth stealing were found, another, at the same moment, pretended to conceal about him a few small ones; and, while he thus attracted the attention of the superintendents, and occasioned some bustle, the real thief was able to secrete his prize.

This contrivance was discovered by one of the poor Ceylonese who attended the washing of the pearls; he made it known to the master of the boat, and then, having reason to dread the vengeance of the thieves, he immediately fled. For some days he proceeded without shelter, till arriving at the hut of a farmer, who lived near a cinnamon plantation belonging to Government, he supplicated him for relief and a lodging. This man was very poor; he had a large family, and could with difficulty shelter the fugitive for one night; besides, suspecting that the story was not quite true, and that it was the thief instead of the informer who told it, he was not willing to let him continue there, lest it should bring himself under suspicion. The Ceylonese was hurt at a doubt which he so ill deserved, and left the farmer early next morning, wandering he knew not whither, till he found himself, just when the sun was at its height, in a tangled and extensive forest. There he sat down to rest under a banyan-tree, whose self-rooted branches, entwined with creepers, had become nearly impenetrable;—and there he determined to remain, as long as the forest supplied him with fruit and wild honey. Fear had taken such possession of him, that he was afraid to venture back to the more inhabited parts of the country; and yet he was here in equal dread of the *Bedahs*, a race who live in the forests and mountains, and who refuse to associate with the more civilized Ceylonese.

It is supposed, Colonel Travers told us, that the *Bedahs* are descended from the original inhabitants; and that, having fled from the Ceylonese invaders, they have retained, with their ancient customs, their hatred and fear of the invaders. They live by hunting, they sleep in the trees, placing thorns and bushes on the ground round them, to

give warning of approaching wild beasts ; and, on every alarm, a Bedah climbs the highest branches with the expertness of a monkey.

There are some tribes of the Bedahs in the southern part of the island who are rather less wild, and who even carry on a little traffic with the Ceylonese ; but they are so afraid of being made prisoners, that when they want to procure cloth, knives, iron, or anything of that kind, they approach the town where it is to be had at night, and deposit in a conspicuous place a fair quantity of goods, such as ivory, or honey, along with a *talipot* leaf, on which they contrive to express what they want in exchange. On the next night they return, and generally find what they had demanded, for, if their requests are neglected, they seldom fail to revenge themselves.

Fruits of various kinds are so abundant in Ceylon, that, for some time, our poor fugitive was supplied with tolerable sustenance ; and he often refreshed himself with the pure limpid water found in the Bandura, a most curious plant, whose leaves terminate in a kind of tube, which contains nearly half a pint of water, covered by a little valve. At last, anxiety brought on a low fever, his strength failed, and he lay under the banyan, expecting to die of hunger. Early one morning he was roused from a sort of half stupor by hearing the low growl of a dog ; and, on opening his eyes, he saw a man stooping to place something near him ; he tried to speak—but the person had vanished. He had perceived, however, by his tall light figure, and his copper complexion, that the stranger was a Bedah ; and this would have been a very terrific idea, had he not smiled as he went away, and pointed to a little basket that he had left. Plants and refreshing fruits were again within his reach, and the poor starving man ate thankfully, and felt as if he should live. Every morning he found a fresh supply in the same place ; and as his strength began to return, the Bedah, besides the basket of fruit, added some more nutritious food. This was dried meat preserved in honey, to keep it from the air ; and tied up in a particular substance which grows on the betel-tree, at the root of each leaf ; it somewhat resembles a tough skin, and is of so strong a texture, that it retains water. He wished to thank the Bedah, and frequently beckoned to him to stay ; but the good-natured savage shook his head, and disappeared.

When he felt himself quite recovered, and his strength restored, he resolved to procure employment, if possible, in the cinnamon groves. The grand harvest, which lasts from April to August, had begun; and he hoped that, in some of the various processes of cutting, scraping, or barking, which are parcelled out among several classes of peelers, or *choliahs*, he might find work.

On his way from the forest, in passing by the same house where he had been permitted to lodge one night, he perceived that the farmer's cattle had broken through the inclosure, and made their way to the cinnamon-trees, on which they were then feasting. This tree is such a favourite with cattle, that they break down every fence to get to it; and most of the natives who live in the neighbourhood of those plantations are deterred from having cows, because all that are found trespassing there are forfeited. This poor creature knew that, by giving information to the head officer, he might receive a reward which would relieve him from distress; but he had a more generous mind. He hastened to the farmer, and assisted him to drive back the cows and repair the fence, before they were discovered. The farmer was anxious to show his gratitude, and he felt convinced that he had wronged him by his former suspicion. By his recommendation to the superintendent of the cinnamon-groves, our wandering Ceylonese obtained employment; and in a short time felt himself so happy, that he had reason to reflect with satisfaction on his honesty and generosity.

As soon as he was able to save a little money, he purchased some few articles which he thought might be acceptable to the friendly Bedah; and by setting out in the night, he arrived early in the morning at the forest, and deposited his offering on the very spot where, for so many successive days, the food had been placed which saved his life. In vain he delayed there in hopes of seeing the Bedah, till he was obliged to return to his work; but as he heard the well-known growl at no great distance, he knew that he was observed, and that his present would be found. Colonel T. says, that the dogs of the Bedahs are remarkable for their sagacity in tracing game, and in distinguishing the scent of different animals. On the approach of a stranger, or of any dangerous beast, they first put their master on his guard, and then help to defend him; and so invaluable are they to this tribe, that when their daughters marry, these dogs form their portion.

Our industrious Ceylonese had built a hut, during his residence at the cinnamon plantation. It was formed from a single cocoa-nut tree; the stem furnished posts; the branches supplied rafters; and the leaves formed a covering sufficient to repel both sun and rain. The Ceylonese huts are fastened entirely by withes of ratan, or by *coya* rope, which is made of the fibrous threads of the husk of the cocoa-nut. They are sometimes strengthened with slender pieces of wood or bamboo, and daubed over with clay; and round the walls are benches to sit or to sleep on.

Colonel Travers took the opportunity of telling us that the cinnamon-twigs are first scraped with a peculiar kind of knife, convex at one side, and concave opposite: the bark is then slit with the point, and the convex side of the knife is used to loosen it, till it can be taken off entire; it appears like a tube in that state, and the pieces are laid one within another, and spread to dry. When quite dried, they are tied up in bundles of about thirty pounds weight, and are carried by the choliahs to the cinnamon store-houses at Columbo.

Being no longer afraid of the pearl-gatherers, he returned to Condatchy; and, as it is a usual practice to search for pearls which may by chance have dropped from the oysters while they lie in the pits, he also went to see how far his present good fortune would continue to befriend him. Those pits are dug about two feet deep in the ground, and lined with mats; and the oysters are left there to putrefy, as they are then easily opened without injuring the pearls. His search was successful beyond his hopes; he found a pearl of uncommon size, and joyfully carried it to the collector, who rewarded him with a large sum of money.

It is easy, dear Mamma, to guess the rest of the story. He bought cloth, axes, knives, and various useful things; and making his way once more to the banyan tree, he laid these offerings of gratitude in the spot so well known to him and the good Bedah—and again he heard the faithful dog growl his knowledge of his being there. He then visited the farmer, and found him in the greatest distress; for his cattle having again trespassed on the cinnamon-grounds, they had been all seized. The kind-hearted Ceylonese bestowed on him a sum more than sufficient to replace his cows; and it was difficult to say which felt the most happy—the farmer suddenly relieved, or the generous creature who relieved him.

16th.—We all petitioned my uncle to read 'The Tempest' to us yesterday evening. He consented, upon condition that Mary should assist; and it was arranged that she should read the parts of Miranda and Ariel.

Mary is so timid, that she does not like even such a moderate exhibition: she complied, however, and they both read so delightfully, that every one perceived beauties in that play which they had never noticed before. At the end of each act, we talked it over; and my uncle encouraged every one to give their opinions, which he says is the best way of inducing people to think.

My aunt said that none of Shakspeare's plays are so perfect, as to the time in which the action takes place, as the Tempest, or display so much imagination; for, while he seems to leave one at liberty to wander through the wild and the wonderful, yet such is the correctness of his taste, that in this piece he never suffers it to pass the bounds of consistency.

Caroline was most pleased with the part of the 'delicate' Ariel. 'It is quite charming,' she said, 'he is so well imagined: his qualities and offices and his expressions are so suitable to each other, and so nicely described by himself. Besides, he seems so amiable and good-natured to the shipwrecked strangers, that, even while we consider him as the artful agent of the magician, he seems to have the qualities of almost a celestial being.'

I asked her which she liked best, Ariel, or the fairy sprites in *Midsummer Night's Dream*. 'Like you, Bertha, I delight in all Shakspeare's fairy-land,' said she; 'but I think Ariel in every way superior to Puck: even his tricks are more elegant and graceful, and he seems to sympathize with the people he is teasing; but Puck, however amusing, is a wild mad-cap, that revels in his antics, and ridicules the poor victims of his merry mischief. I like to think of Ariel as he "lies in the cowslip's bell," or "rides on the curled clouds, to do his master's bidding," with such swiftness as to "drink the air before him."'

My uncle praised the drawing of Caliban's character. 'Every time I read it,' said he, 'I see fresh proofs of its complete originality. Shakspeare could have had no model for such a creature—it could only be the work of his own extraordinary imagination, and it shows what powers of invention he possessed. Caliban is just what the offsprin

of a witch and a demon should be: he is a prodigy of cruelty and malice; and Shakspeare heightens the effect, by giving him a language so poetical and yet so gross, that all he says, whether in brutal malice, or in uncouth kindness, is in perfect keeping with his general character. It expresses the instinctive barbarity of the monster; and the mind is throughout divided between the detestation excited by such a horrible being, and astonishment at the versatile genius by which it was conceived.'

'Miranda is my favourite,' said my aunt; 'I am sure there is as little commonplace in it as in either of the singular characters you have been praising. In hers, innocence and gentleness are the predominant features; while the union of the softest tenderness for Ferdinand with her candour and dutiful deference to her mysterious father, give it the most amiable finish; and I think the skill of Shakspeare in painting it is, at least, equal to that shown in any other of the play; for the many beautiful little touches by which it is brought out appear to me to show more talent than when violence of passion and great strength of expression are used.'

'On the bat's back do I fly
After summer merrily.'

I repeated these lines in Ariel's song, and asked the meaning of 'after summer.' 'Some critics,' said my uncle, 'have thought it should be *after sunset*, because Ariel speaks of riding on the *bat*; but commentators delight in deep and hidden meanings, and it has therefore been suggested, that as the fairy tribe dislike winter, Ariel, who is now to be restored to liberty, rejoices that he may follow summer round the globe; and therefore he is said to *fly after summer*.'

17th.—We have been reading the life of that delightful musician, Mozart; and he is claimed by each party. But I think he can give very little support to Mary; for though his father was a teacher of music, and early began to instruct him, his rapid progress and juvenile success seem to have gone far beyond the effect of circumstances, which in a hundred cases have been the same with other musical teachers and other children. Mozart was but four years old when his great delight was seeking for *thirds* on the piano-forte. When five, he learned difficult pieces of music

from his father so quickly, that he could immediately repeat them; and in the following year he invented little sonatas, which he played for his father, who always wrote them down to encourage him.—Music was introduced into all his sports, none of which were acceptable to him without it; and if sometimes a fondness for the usual occupations of childhood did influence his mind, yet music soon became again the favourite object.

Before he was six years of age, his father, observing him writing busily, asked what he was doing; the little boy said, he was composing a concerto for the harpsichord. The father took the paper, and laughed heartily at the blots and scribbles; but when he examined it with more attention, he showed it to a friend with tears of delight, saying, 'Look, my friend, every thing is composed according to the rules; it is a pity that the piece cannot be made use of; but it is too difficult, nobody would be able to play it.'

The progress of this wonderful child was equal to this beginning; and in various public exhibitions in Germany, and particularly at Vienna, he excited, at a very early age, the astonishment of all musical people, by his science, by the correctness of his ear, and by his powerful execution. At the age of thirteen, he composed his first opera; and you well know, Mamma, the numerous beautiful compositions which distinguished his short life; for he died at the age of thirty-six. Surely this was a genius!

WEEK 20.

The humbling of Pharaoh—Passage of the Red Sea—Sponge—Mrs. P. arrives—Winter's Day—Capping Verses—Christmas Eve—Heathen Festival—Yule—Mummers.

Dec. 18th.—Sunday. My uncle read to us, this morning, the chapters which relate the humbling of Pharaoh and the going forth of the Israelites; he afterwards said, 'In the wonderful judgments inflicted on the Egyptians, and in the miraculous institution of the Passover, when the destroying angel passed over the house of every Israelite, w see, my dear children, the operation of that Being whos will controls the elements of nature and directs the pas sions of mankind.

‘No human force is exercised — no Israelite lifts the sword ; yet the Egyptian monarch is humbled, his people are terrified, and both urge the departure of the Israelites ; who even demand, and obtain from their late oppressors, silver and gold, as payment for their past labours. “ Rise up and get you forth,” said Pharaoh, and they immediately commenced their march, before his hardened mind again repented of yielding to the decrees of the Almighty.’

Wentworth asked his father, how the Israelites could carry their kneading troughs on their shoulders ?

‘It appears,’ said my uncle, ‘from the accounts of various travellers, that to this day the Arabs, who dwell in the countries through which the Israelites passed, are in the habit of eating unleavened cakes ; and that the vessels still used there for kneading them are small wooden bowls : these, you see, could be very conveniently bound up in the kneading-cloths and tied on their shoulders. The Arabs have also, among their travelling furniture, a round thick piece of leather, which they lay on the ground, and which serves them to eat upon ; round it there is a row of rings, by which it is drawn together with a chain ; and it hangs, by a hook at the end of the chain, to the side of the camel in travelling. In this leather they carry their meal, made into dough ; and when the repast is over, they wrap up in it all the fragments that remain.’

‘I wonder,’ said Frederick, who was looking at the map, ‘I wonder, heavily laden as they must have been, that they did not take the shortest road to the promised land, instead of going round about by the Red Sea.’

‘The regular route to the promised land,’ my uncle replied, ‘was certainly along the coast of the Mediterranean, towards Gaza and the other cities of Palestine, which were a portion of Canaan, and at no great distance from the Lower Egypt. But the way by which it was the Divine will to lead them was through the Red Sea ; as being not only impracticable for their return, but being eminently calculated to impress them with a sense of the miraculous power which guided and protected them through the “ deep.”’

I asked my uncle, then, what was meant by the word wilderness. He said, ‘The word occurs in a great many places, both in the Old and New Testament, where it sometimes means a wild, uninhabited desert, and sometimes

only an uncultivated plain: the wilderness, through which the Israelites were conducted, partook of both these descriptions, being partly rocky, and partly a sandy, unproductive district. It occupied the space between the two branches of the Arabian Gulf, which was sometimes called in Hebrew, and is, indeed, at this day, in the Coptic language, the "Sea of Weeds."

'Why, then, do we give it the name of the Red Sea?'

'We have borrowed the term from the Greeks,' said my uncle: 'from whence they derived it is not so easily answered; certainly not from the colour of the water, or of the sand at the bottom. The most probable notion is that it was originally called the sea of *Edom*, as it washed the coast of that country; and that, as *Edom* signifies *red* in Hebrew, the Greeks, not understanding the geographical allusion, simply translated it, just as the Romans and ourselves have done after them.'

A general conversation then ensued about the passage of the Israelites through the sea; and I shall write here some of what I picked up, by way of exercise only—for I am sure, Mamma, that you are already well acquainted with all that is known on the subject.

The exact spot at which they quitted the Egyptian shore has been much contested among commentators; but the greatest number of opinions seems to be in favour of *Clysma*, a point several hours' journey from the town of Suez, which stands at the head of the western gulf. The names that some of the places in the vicinity still retain appear to confirm this supposition; for instance, the ridge of hills extending from the Nile to this part of the coast is called *Ataka*, which means *deliverance*; and the narrow plain to the southward of that ridge preserves the name of *Wadi-el-tihah*, or the *Valley of the Wandering*. On the opposite shore of the Red Sea there is a headland called *Ras Mousa*, or the *Cape of Moses*; farther to the southward, *Hammam Faraun*, *Pharaoh's Baths*; and the general name of this part of the gulf is *Bahr el Kolsum*, or the *Bay of Submission*. From these circumstances, it may be concluded that the Israelites crossed the western arm of the Red Sea, about twelve or thirteen miles from Suez; and it appears, from my uncle's maps, that the sea there is eight or nine miles broad.

My uncle says, it is the opinion of some geographers

that formerly the Red Sea did not stop at Suez ; and modern travellers have described a large plain which is considerably lower than the surface of the sea, and which extends seven or eight leagues to the northward of that town. This plain is two leagues in breadth ; and from the thick layer of salt, and the quantity of shells which are everywhere found under the soil, they say there can be no doubt that it was once the bed of the sea. I asked what could have driven the sea out, if ever it had been there ? But he said there was no difficulty in that ; for rivers and narrow seas are continually changing their boundaries by the sand which their tides and currents throw up ; and as soon as ever the Red Sea had washed up a new barrier at Suez, evaporation in that climate would rapidly dry the part that had been cut off.

It has been asked, were there not ledges of rock lying across the Red Sea, on which, when the tide was out, the Israelites might have forded it ? ‘ But,’ says my uncle, ‘ if we do not believe the transaction to have been miraculous, we may as well not believe it at all ; for the event, as well as the miracle, rest on precisely the same authority. At the same time, do not suppose that I wish to discourage these inquiries ; they are of considerable use ;—they lead to the investigation of facts, and the more strictly the Bible is examined, the more we shall be satisfied of its truth. The attention of the celebrated travellers, Niebuhr and Bruce, was particularly directed to that question ; and they distinctly assert that there are no rocks there whatever.’

My uncle concluded the conversation by saying, ‘ Many of the Fathers have supposed it to have been the opinion of St. Paul, that the passage through the waters of the Red Sea was intended as a type of the Christian baptism, and of our conditional resurrection to eternal happiness. And it was this idea that probably induced the framers of our liturgy to introduce the history of that event into the service appointed for the day of our Lord’s resurrection.’

19th.—We amused ourselves for some time after dinner this evening with our favourite question-play, animal, vegetable, and mineral ; Marianne is well acquainted with it.

I thought of sponge as a good puzzling thing : however, it puzzled me not a little, in the progress of their questions, to describe it satisfactorily. In the first place, I had heard some one tell you that sponge was a vegetable production ;

but I have since read that it is a substance formed by some species of marine worm : so when I was forced to give distinct answers to the questions, was it animal, or was it vegetable, I was divided between those two ideas. Then came questions as to what part of the world it was found in ; and I set them all wrong by saying, only in the Mediterranean. In short, I found that, even in children's plays, people may have to blush for their ignorance.

After I had puzzled in and out of the question, and that our play was ended, my uncle told me that sponges, of which there are now known more than a hundred different species, are found in a multitude of places, on the shores of both the old and new Continents. 'Those most valued in the arts,' said he, 'are inhabitants of the Mediterranean, and part of the Indian ocean ; two small kinds of sponge thrive even on the frozen shores of Greenland ; and forty species have been discovered on the coasts of Great Britain. They are found equally in places that are always covered by the sea, and in those which it leaves dry with the ebb tide. They adhere to rocks, and spread all over their surface. In some places they keep possession of the most exposed cliffs, but they thrive best in sheltered cavities, and are found lining the walls of submarine caves, attaching themselves indifferently to mineral or vegetable, or even to animal substances.

'The size to which sponge attains is very uncertain. I lately saw an account of one found at Singapore, in the East Indies, which was shaped like a goblet, and measured round the brim fifty-one inches ; the stem was seventeen inches, and it contained thirty-six quarts of water ! Naturalists have agreed to seven general divisions of form, so as to make something like an arrangement of this most singular class of organized beings.'

I interrupted my uncle here, to ask whether, in calling them organized beings, he meant the substance of the sponge, or the insects that are supposed to form it.

'It is curious,' replied he, 'that, two thousand years ago, the Greeks were occupied with this very inquiry ; some endeavouring to prove the vitality of sponge, and others to show that it was merely the work of certain worms : and, even so late as the year 1752, Peyssonnel, the naturalist, communicated to the Royal Society a paper in support of this last opinion.

'Most naturalists, however, now agree in regarding sponge as a *zoophyte*, or a kind of animal approaching nearly to the form and nature of a plant; and Linnæus himself, latterly, classed it amongst animals. As the large orifices appeared to be the only means of entrance to the internal canals, it was supposed that the nourishment of this animal was drawn in through them; but later discoveries have shown that, besides those apertures, there are minute pores over the whole surface; that through those pores the water is imbibed, by which the creature is nourished; and that the large round holes convey a constant stream of water away from the interior of the body. This stream carries off the particles of matter which are constantly separating from the interior, and which are not only perceptible by the assistance of the microscope, but may be occasionally seen by the naked eye, like small flakes. When a living sponge is allowed to remain a day at rest, in a white vessel filled with pure sea-water, an accumulation of feculent matter is always found immediately under each orifice. If it is confined in the same basin of water for two days, the currents appear to cease; but on plunging it again into water newly taken from the sea, they are renewed in a few minutes; and the continual circulation of water through the body, Dr. Grant, who appears to have studied this subject with great perseverance, says he no longer doubts forms one of the living functions of this animal.

'It would only burden your memory,' continued my uncle, 'were I to tell you all the various opinions which have been formed respecting the anatomy of the sponge. I will merely say, that Dr. Grant affirms, though in opposition to M. Cuvier, that the fibrous part of the sponge, which is insoluble in water, and forms a net-work through every part of the body, is the skeleton of this zoophyte, serving, as in other animals, to give form to the body, and support to the softer organs.

'Sponge attaches itself sometimes to marine plants, so as to choke up their pores. Small bits of the same species will spread towards each other, and become one piece; and it is amusing to observe, Dr. Grant tells us, the growth of the young *Spongiæ parasiticæ* on the back and legs of a species of crab, where they frequently collect to the number of forty or fifty, interrupting the motion of its joints, and spreading like a mantle over its back, or perhaps rising in

fantastic ornaments upon its head, which the crab is unable to remove.'

21st.—When I parted from Mrs. P. at Falmouth, my uncle who was much pleased with her kindness to me, made her promise to pay a visit here in some little time. That time has, at last, come. We have her now actually in the house, and I have once more the pleasure of being with a friend who was so kind and tender to me when I left you, my beloved Mamma. How many little circumstances are recalled to my mind by seeing her! She has just the same quiet, composed look that she used to have; and, though always ready to converse and to impart the information she possesses, yet her countenance seldom loses a certain expression of sadness.

She arrived last night, and has promised to stay till after Christmas. I believe a few other friends are to be here also, but I am no longer such a fool about strangers.

Many a time, things which you have said to me, and which then I scarcely heeded, return to my mind. How often, for instance, you have told me that we lose much real enjoyment by that sort of fear or reserve which I used to feel at the sight of a new face; and now that I have learned to listen attentively to conversation, I see what amusement, as well as knowledge, one may gain from the mixture of characters to be met with in society. Indeed, every day shows me how much real goodness there is, though of various kinds, among people who at first sight seem only intent on their own affairs.

I am sure that I at least have received a great deal of kindness in my short life—and particularly since I have ceased to be what you used to call *farouche*.

23rd.—This day has been remarkably cold and wet, and stormy; nothing could appear more dreary, and when I looked out, I persuaded myself that I felt quite melancholy. We had, notwithstanding, been all as cheerful as usual, and had contrived plenty of amusements for ourselves, in addition to shuttlecock, which warms one so comfortably; but this very dark and gloomy day we could scarcely distinguish our little feathery plaything after three o'clock.

In the evening Mrs. P. taught us a new way of capping verses, which is a little more difficult, but I think much more amusing than the common method. Instead of each person being confined to a single line, as much of a poem

is to be repeated as will complete the sense ; and the succeeding quotations are all to allude either to one general subject, or at least to something touched upon by the previous speaker.

I will give you a sample in which we all joined :—

UNCLE. Heap on more coals: the wind is chill;
But let it whistle as it will,
We'll keep our merry Christmas still.

AUNT. Still linger in our northern clime
Some remnants of the good old time;
And still, within our valleys here,
We hold the kindred title dear.

FREDERICK. Decrepit now, December moves along
The plashy plains.

CAROLINE. Phœbus arise,
And paint the sable skies
With azure, white, and red;
Rouse Memnon's mother, from her Tithon's bed,
That she with roses thy career may spread.

BERTHA. Sad wears the hour! heavy and drear
Creeps, with slow pace, the waning year:
And sullen, sullen heaves the blast
Its deep sighs o'er the lonely waste!

WENTWORTH. Who loves not more the night of June
Than dull December's gloomy noon?
The moonlight than the fog of frost?
And can we say which cheats the most?

MRS. P. Mustering his storms, a sordid host,
Lo! Winter desolates the year.

MARY. Yet gentle hours advance their wing,
And Fancy, mocking winter's night,
With flowers, and dews, and streaming light
Already decks the new-born spring.

December 24th.—

'Twas Christmas broach'd the mightiest ale,
'Twas Christmas told the merriest tale;
A Christmas gambol oft could cheer
The poor man's heart through half the year.

How happy every one looks in these good Christmas times! Besides those feelings of gratitude and hope, which

now come home to every Christian's breast, it is delightful to see the satisfaction the rich feel in this country in sharing their comforts with the poor.

I need scarcely tell you, who know my uncle and aunt so well, how much they enjoy the pleasure of giving food and clothing and blankets to those who are in want; while to the cottagers who do not require such assistance, they make some useful present, such as a book or some little article, which is sure to be highly valued, as it marks the approbation of their landlord. Of course the Franklins and our old basketmaker have not been forgotten. My aunt says she likes to make the poor more than commonly comfortable now, that they may remember the season with pleasure.

Farmer Moreland, and two or three other rich farmers in the neighbourhood, are very considerate of the comforts of their labouring men at this season; and they have joined with my uncle and aunt in trying, by giving them constant employment, to enable them to struggle on by their own exertions without applying to the parish for support. Many have large families, some of which are taught, even while very young, to help their parents; and it is to these people that my aunt distributes the largest portions of her Christmas bounty.

In speaking of Christmas, my uncle told me that in the heathen times of these countries, and of the northern parts of Europe, a festival took place exactly at this season, which was dedicated to the sun, the chief deity of our heathen ancestors; and when they were converted to Christianity, it was thought prudent that they should continue to have their festival, although the object of it was of course changed. It was called *Jol* or *Yule*—a Gothic word, signifying a feast, and particularly applied to a religious one. Christmas is even still called Yule in the north of England, and in other remote parts of it; and it is said that the custom of making a large fire on Christmas eve, on which great logs of wood are piled, is still kept up. These are called *Yule clogs*, and, before they are quite consumed, a fragment of them is taken out, and preserved safely for the next year.

This is probably one of the remnants, my uncle says, the feasts of fire instituted by the worshippers of Bali, from whom there appears reason to think the Druids were direct descended; as a coincidence of customs, words, names, and ancient worship is in many instances observable.

Just as we had done tea this evening, while my uncle was talking on this subject, he was interrupted by a loud ringing at the hall-door, and it was scarcely opened when there was such a noise in the hall, such singing, talking, laughing, and dancing, that I was alarmed at first; but my aunt told me it was only the *Mummers*. We went to look at them, and I understood that they were acting *St. George and the Dragon*; but it was such a strange confused medley, that I could only distinguish a word or two. They had all hideous masks, and were dressed up in the most grotesque way; and everybody was highly diverted except poor little Grace: she was so frightened by the bustle and strange figures, that my uncle was obliged to reason with her. A word or a look from him has unspeakable power over the minds of all the family, and indeed of all who know him.

The mummers' song I could not understand, except one stanza, which they repeated always more distinctly than the rest, as a hint, I suppose, to my uncle:—

In Christmas time is found
The best of stout old beer,
And if it now abound,
We shall have dainty cheer;
Then merrily dance we round,
And so conclude the year.

My uncle good-humouredly gave them a few shillings to get their 'stout old beer,' and they hurried off to visit some other house.

WEEK 21.

Christmas Day—Restoration of the Jews—The Dying Woman—The Gypsies—Anson's Voyage—Coral Islands—Cataract of Trallhatta—Ingenuity of the Norwegians—Vinegar of Ants—Ant-hills.

Dec. 25th.—Sunday. We all met in health and cheerfulness this good Christmas morning, and in our heartfelt wishes for mutual happiness, yours, dear Mamma, was included as ardently as if you had been present.

To the usual old-fashioned expressions of kindness, my aunt added, in her impressive manner, a tender wish that we might receive such gracious aid from above, as would enable us to rejoice indeed on this great day.

After some general conversation, my uncle explained to

us the 45th Psalm, which is appointed for the service of Christmas-day; and which, he says, like many of the other psalms, is constantly read and but little understood.

'It appears,' said he, 'to be a song of congratulation upon the marriage of a great king; but, from a consideration of all the subjects on which it touches, there is no doubt that it prophetically alludes to the mystical wedding of Christ with his church. This was the unanimous opinion of all the Jewish expositors—for though prejudice prevented them from discovering the completion of the prophecies in our Saviour, yet they well understood their meaning, and all allowed that this psalm related to Him, and not to any earthly prince.

'This figure, of the union of a husband and wife, has been consecrated by our Lord himself, to signify his own union with his church, in the parable of the king making a marriage for his son. Some commentators have imagined that the marriage of Solomon with Pharaoh's daughter was the subject of the 45th Psalm; but it is in many respects wholly inapplicable to that king. The hero of the poem is a warrior, who reigns at length by conquest over his vanquished enemies: Solomon, on the contrary, enjoyed a long reign of uninterrupted peace. He is also distinguished by his love of righteousness; whereas Solomon, during the latter part of his reign, fell far short of the excellence here described. But above all, the king is addressed by the title of God, in a manner which is never applied to any earthly king.

'The Psalmist begins with our Lord's first appearance in the human form, and passing rapidly through the different periods of Christianity, makes them the groundwork of this mystic and inspired song, which may be divided into three parts.

'The first three verses describe our Lord on earth in the days of his humiliation. The second section consists of the five following verses, which relate to the propagation of the gospel by our Lord's victory over his enemies; and this includes the whole period, from his ascension to the time not yet arrived, of the fulfilling of the *Gentiles*. The sequel alludes to the re-marriage—that is, to the restoration of the converted *Jews* to the bosom of the true church.

'“Thou art fairer than the children of men.” Thou we have no account in the gospels of our Saviour's pers

yet it is evident, from many circumstances, that there must have been a peculiar dignity in his appearance. But it was the sanctity of his manners; his perfect obedience to the will of God; the vast scope of his mind, which comprehended all knowledge; his power to resist all temptation, and to despise shame and to endure pain and death, to which that expression alludes—this was the beauty with which he was adorned beyond the sons of men.

“Full of grace are thy lips.” This is put figuratively, for that perfect doctrine which he delivered, and which, if sincerely adopted, was to sustain the contrite, to console the afflicted, and to reclaim the guilty.

“The king’s enemies” are the wicked passions of mankind, against whom he wages a spiritual war; and the “sword and arrows,” St. Paul tells us, mean “the sword of God.”

‘The seventh and eighth verses show the King seated on the throne of his mediatorial kingdom, where he is addressed as God, whose throne is everlasting, and as a Monarch whose heart is set upon justice and righteousness.

‘In the first dispensation of the law through Moses, the perfumed garments of the priest were typical of the graces and virtues of the Redeemer, and of the excellence of his word; so the Psalmist describes the King, of whom the high priest was the representative, as scented with myrrh, aloes, and cassia.

‘In the figurative language of scripture, “king’s daughters” express peoples and nations, and here mean, that the empires converted to the faith of Christ will shine in the beauty of holiness, and will be united to the Messiah’s kingdom.

‘The “Queen” evidently represents the Hebrew Church, re-united by conversion in the fulness of time. The restoration of Israel to the situation of consort in the Messiah’s kingdom is the constant strain of prophecy; whole chapters might be quoted; but I think it will be an interesting employment to some of you to search for them yourselves. I will only remind you of that passage in the epistle to the Romans, where St. Paul says, that blindness is *in part* only happened to Israel, till the time shall arrive for the fulness of the Gentiles to come in; and then all Israel shall be saved.

‘The Queen’s “vesture of gold” denotes those real trea

tures, of which the church is the depository, the written word, and the dispensation of its gracious promises to mankind.

“Forget thine own people, and thy father’s house.” This applies to the ancient Jewish religion, and its typical ceremonies and sacrifices, now no longer necessary. The remainder of the psalm alludes to the churches established under “the King;” to the simplicity and excellence of the Christian dispensation; and closes with an assurance that the children of the Queen Consort, that is, the church, after collecting the lost sheep of Israel, shall be, as their fathers were, God’s peculiar people.’

My uncle concluded by saying, that this beautiful psalm, which is written in such majestic language, and presents such cheering hopes to Christians, Jews, and Gentiles, has been a constant subject of discussion amongst our learned divines; and advised us to read with attention the excellent commentaries on it by Bishop Horne, and Bishop Horsley.

26th.—This day is so calm and bright that it is not like winter; it almost brings to my mind some of our own days at home. Oh! Mamma, if you were but here, all would be delightful.

We are all going to walk to Farmer Moreland’s, except Wentworth and Frederick, who are mounting their ponies to visit a friend just returned from Eton.

I am called—Yes, quite ready. Good day, dear Mamma.

Well, Mamma, evening has come, and I have but little to tell you about our Christmas visit to Farmer Moreland and his dame, which was happily accomplished; but a great deal to tell you about Wentworth and Frederick, and their adventures. When they had ridden about a mile, they were stopped by a little boy, who came running from a lane in the wood, crying piteously, ‘Mother, mother! oh, come to mother!’ To all their questions he gave no other answer but ‘Come to mother! oh, do come, she is a-dying!’ The child was a very little creature, and seemed scarcely to know any other words.

My cousins, without hesitation, or any thought about their ride, determined to follow the child, who, though he could not say much, knew very well what to do. He led them along one of the green lanes a considerable distance into the wood, and there they found his poor mother lying, without any other shelter than that of a large spreading

holly—without blanket or covering—her head resting on a little bundle, and looking deadly pale. The child ran towards her, and gently patting her face, cried, ‘ Here, mother ; look, look !’

As Wentworth approached, she opened her eyes, and seeing a benevolent countenance, smiled faintly. She tried to raise herself, but could not. In reply to his inquiries, she made him understand that, having travelled two days with little rest or food, suffering much from grief, along with fatigue, she had grown so ill that she was obliged to stop there. Not seeing any cottage near, in which she could beg a lodging, and feeling totally unable to walk farther, she had lain there many hours, but had not seen any one pass, and fearing that the child would be starved, she had sent him in search of some kind-hearted person. She added that she was sure her illness was a fever ; and as there was, therefore, little chance of her being admitted into any house, all she wished for was a shed to cover her, some water to drink, and some bread for her little boy.

My cousins, promising assistance, rode home instantly, in hopes of finding my uncle, but we were all at Farmer Moreland’s. They tried then to find some one who could erect a shed over the poor woman ; but it was a holyday, no labourers were at work ; and the steward, who was the only person they found, had received orders not to leave the yards all day, because many idle people might be about. He told Wentworth he could easily supply materials for a shed, if there was any one to build it. Wentworth and Frederick looked at each other for a moment, and then both said together—“ Let us do it ourselves, and give up the ride.” Each had been afraid of disappointing his brother by the proposal, but they agreed to it with equal good will, and set about their new occupation so earnestly, that in a quarter of an hour the garden ass-cart was loaded with straw and stakes, and the necessary tools. Before they went away, they applied to my aunt’s housekeeper for bread and medicine ; and she very good-naturedly went herself to see what state the woman was in, and what could be done for her. She afterwards told my aunt, that it was ‘ a beautiful sight to see the kindness of the young gentlemen, just as careful, Ma’am, not to disturb the sick beggar-woman as if she was a lady, and they so happy, Ma’am, and never seeming to cast a thought about their ride.’ While they

were at work, the housekeeper learned the history of the unfortunate creature; she thinks her dangerously ill, and has therefore procured a good old woman to take care of her.

My cousins not being very expert in driving stakes into the ground, or in fastening on thatch, it was nearly dark when they reached home. We had long returned from our walk, and had been listening to the history the housekeeper gave. My aunt and uncle were very much pleased at hearing of the benevolence and the decision with which Wentworth and Frederick had acted; and they determined not to interfere with them till their task was completed.

The story of the poor woman can be told in a few words. When very young, only sixteen, she was tempted to leave her father's cottage, and to go off secretly with an idle wandering man, belonging to a party of gypsies, to whom she was afterwards married. Her husband had lately grown very unkind, and last week he forsook her entirely. She heard that he had come to the forest of Deane, and, without waiting to make further inquiry, she took her little son, and set off in search of her wicked husband. Her parents are dead, and she has no friends but the gypsies, among whom she has lived for several years; she says they are bad people, indeed, and to leave her boy with them would be his ruin. Her only anxiety is about him; were she sure of his being in safe hands, she says she has no longer any wish to live.

The housekeeper inquired the name of the child; but his mother acknowledged that he had never been christened, as the people she was with did not attend to those kind of things. He has generally been called *Quick-finger*, amongst them, because he was so clever at little thefts; but she had intended, she says, to have had him baptized, and to call him Charley, after her own father. She then fell into an agony of grief, at the remembrance of her father, and the time when she was happy and innocent, as well as at the wickedness her poor little boy has already been taught.

Dec. 28th.—During our passage from Brazil, Capt. M. lent me one of your old favourites, Anson's *Voyage* and, next to Robinson Crusoe, it interested me more than anything of that kind I ever read. You may guess then with what pleasure I have been looking over the account of a late visit to Juan Fernandez, by Mr. Scouler, who was en-

ployed by the Hudson's Bay Company, to examine the natural history of the north-west coast of America. I think two or three little extracts will amuse you ; and I must tell you, by the way, that Mr. Scouler seems to feel great admiration for *our* city of Rio, and the bay, and the view from the Corcovado, and all our beautiful plants, birds, and insects.

' Dec. 14, 1824.—The island of Juan Fernandez was approached with equal interest by every one in the vessel, but with different feelings ; as classic ground by the seamen, and as a new field for research by the naturalist.

' We landed at a small bay at the northern extremity of the island. The level land near the coast had more resemblance to an European corn-field, than to a desolate valley in the Pacific Ocean, being entirely overgrown with oats, interspersed in different places with wild carrots. On penetrating through the corn-fields, we discovered a small cavern, excavated in the decomposing rock, and bearing evident traces of having been recently inhabited. A kind of substitute for a lamp hung from the roof, and the quantity of bones scattered about, showed there was no scarcity of provisions. Near this, a natural arch, about seven feet high, opened into a small way, bounded on all sides by steep perpendicular rocks, which afforded an inaccessible retreat to multitudes of sea birds.

' The next day on approaching the landing-place in Cumberland Bay, we were surprised by the appearance of smoke rising among the trees ; and we had the pleasure of finding an Englishman there. When he first saw our boat, he was afraid it belonged to a Spanish privateer, and had concealed himself in the woods, as they had formerly destroyed his little establishment. He belonged to a party of English and Chilians, employed in sending the skins of cattle, which are now plentiful, to Chili. We were delighted with the beautiful situation where they had fixed their dwelling close to a fine stream, and surrounded by a shrubbery of *Fuchsia*, mixed with peach and apple trees, pears, figs, vines, and strawberries, rue, mint, radish, and Indian cress, besides oats, were all growing in the greatest profusion ; and the sea abounded with fish.

' Our new friend had a little collection of English books ; and one piece of furniture, which seemed particularly valuable,—an old iron pot, though without a bottom ; but he

had fitted a wooden one to it, and when he had occasion to boil anything, he plunged the pot into the earth, and kindled a fire round its sides.

'We made an excursion to the interior, and found many beautiful plants and shrubs. The dry soil was covered by an evergreen *arbutus*, and a shrubby *campanula*, and every sheltered rock afforded a different species of fern, the greatest vegetable ornament of the island. We refreshed ourselves with strawberries, which were small and pale, but of a very agreeable flavour; and the vine plants were loaded with grapes; they were still unripe.'

I am quite disappointed at Mr. Scouler's not mentioning the myrtle trees described in Anson's Voyage, that tall wood of myrtles that screened the lawn where the commodore had pitched his tent, and which, sweeping round it in the form of a theatre, extended up to the rising ground. I should like to have known what species of myrtle produced timber of forty feet in length. But, above all, I feel disappointed at his account of the cavern; I was thinking of Alexander Selkirk, and could not help hoping that it was to prove the very one in which he had lived; or perhaps that some other romantic Selkirk was then its solitary master, instead of those Chilian cattle-killers.

29th.—There was a long conversation to-day on corals, corallines, and particularly on the formation of islands of that substance, which seems to take place so rapidly in some parts of the world.

Mr. Salt, the traveller, says, that the islands in the Bay of Amphila are composed entirely of marine remains, strongly cemented together, and now forming solid masses, the surface of which is covered by only a thin layer of soil. These marine remains are chiefly corallines, madrepores, and a great variety of sea-shells, of species still existing in the Red Sea. Some of the islands are thirty feet above high-water mark; a circumstance which, he says, makes it difficult to account for the process of their formation. When a pillar of coral rises to the surface of the sea, birds, of course, resort to it; the decay of fish-bones, and other remains of their food, in time produces a soil, which is followed by vegetation, and then it quickly assumes the appearance of a little island, covered with a solid stratum of earth. But in the present case, large pieces of madrepore are found, disposed in regular layers, far above the sea; and

for this no satisfactory reason can be assigned, he says, except that the sea must have retired since they were so deposited: for this tribe of animals cannot work in the air.

There is nothing more curious, my uncle observed, than the changes produced on the face of the globe by the operations of the coral worm, a little creature so small as to be scarcely visible. New islands, he says, produced by its means, are continually rising out of the sea, and old ones are becoming united to others, or to the continent. In reading about something else, I met with a singular instance of this, in the account of Saugor Island, and Edmonstone's Isle, in the Bay of Bengal. Edmonstone's Isle appeared so lately as 1818; it is already two miles long, and half a mile broad, and the channel between the two islands is so shallow, that, in a few years, they will probably be joined together. Vegetation had commenced immediately on the most central and elevated part; saltwort, with one or two other plants, had given it a verdant tint, and, by daily binding the shifting sand, were contributing to form the basis of a more durable soil.

Coral was formerly thought to be a vegetable, and even the celebrated Tournefort considered it to be a marine moss; but it is now known to be the production of a race of animals, of which it seems as much a part as the shell is of the snail. Most of the islands in the South Sea are coral rocks covered with earth. My uncle says, that late voyagers have asserted that the bays and harbours of many of these islands have been observed to be gradually closing up, by the progress of these extraordinary creatures; and that it may therefore be supposed that these separate islands will in time be connected, and actually become a continent!

He told us that M. de Peyssonnel, of Marseilles, was the first who proved by experiment the animal nature of the coral; and showed that those bodies which former naturalists had mistaken for flowers, were, in fact, the insects that inhabited the coral. When the branches were taken out of the water, these supposed flowers, which proceeded from a number of white points in the bark, withdrew and disappeared; and when the branch was restored to the water, they were again perceptible. The white specks he proved to be holes in the outer surface, or bark, and corresponding with a series of cavities within; and secondly, he showed that from these holes a milky fluid issued, which

was an animal juice, and must, therefore, have proceeded from an insect. By immersing coral in strong vinegar, he could dissolve the calcareous bark to a certain depth, so as to show the tubular structure of the interior uninjured.

Carbonate of lime, my uncle says, is the principal part of the substance of the whole tribe of corals and corallines; but where these minute insects, or rather *polypi*, obtain that material, or how they can decompose such an extraordinary quantity of it from sea-water, is one of those secrets of nature which philosophers have not yet discovered, although it is constantly in operation, and on an immense scale.

31st.—Frederick read to us this evening some of De Capell Brooke's travels, and I ran away with the book afterwards, to copy for you this account of the cataract of Trallhätta, in Norway, which must be a singular scene.

'The whole water of the Gotha tumbles with fearful roarings down the rocky declivities, and in its descent forms four principal falls, the perpendicular height of which, taken together, is 110 feet. Yet the navigation is not obstructed; for locks with sluices, like those on navigable canals, have been cut in the solid rock, with incredible pains and labour; through them, vessels can be lowered to the level of the river below the falls, preserving their course with ease, and affording a strong instance of the power and ingenuity of man.'

In conversing about Norway, my uncle said, he thought the ingenuity displayed by the Norwegian peasantry was surprising. Living remote from towns, and scattered among their mountains, they become independent of assistance. The same man is frequently his own tailor, shoe-maker, and carpenter; and sometimes even his own clock and watch maker. Most of them are very expert at carving, and the beautiful whiteness of their fir-wood tempts them to make very pretty ornaments for their cottages. They work neatly in silver, brass, and other metals; and there are few things for the purchase of which they are obliged to have recourse to the distant towns.

Their methods of brewing and baking are very simple. The first consists in a simple infusion of barley, which, with the young shoots of juniper, produces a weak but pleasant beverage.—In making their *flad bröd*, or flat bread, they mix rye-flour with water, and, when the dough is well

kneaded, roll it out like a pancake, but not thicker than a wafer. As fast as they are made, they are placed on a gridiron, and one minute bakes them. Prepared in this way, the rye loses its coarse taste, and the bread is agreeable.

You will not, probably, be inclined to imitate them, but I am sure you will admire the ingenuity of these people in the manner they employ the black ants to make vinegar. These creatures have gigantic habitations, which, in size and appearance, are not very unlike the *gamme*, or hut, of the coast Laplanders. The ant-hills are five feet in height, and are composed of decayed wood, pine-leaves, and bark, mixed up with earth, and strengthened by bits of branches, which must require the efforts of a vast number to move. Streets and alleys branch off in every direction from the main entrance, which is a foot wide; and outside, millions of the little negroes, as they are called, may be seen bustling along, heavily laden. But now for the vinegar: a bottle half full of water is plunged to the neck in one of these hills; the ants speedily creep in, and are, of course, drowned: the contents are then boiled, and a strong acid is produced, which is used for vinegar by all the inhabitants of Norland.

WEEK 22.

The Song of Moses—Mount Sinai—Origin of Gipsies—Contempt of trifles—Similarity of thoughts—Frost—Radiation of Heat—Artificial Ice.

January 1.—Sunday. My uncle read to us the ‘Song of Moses,’ after the escape of the Israelites from Pharaoh and his host. He then said, as nearly as I can recollect, ‘This beautiful composition is not only a thanksgiving for their memorable deliverance, but it contains also precise prophecies of the downfall of the nations of Palestine, with the settlement of the Israelites in their room; and of the establishment of the temple on Mount Zion, with the ultimate destruction of all idolatry.

‘It is the most ancient poem now extant, and shows the early connexion which subsisted between poetry and religion: it is also a fine example of that species of composition in which the Hebrews excelled; namely, that of expressing in hymns of triumph their gratitude to God for his glorious protection.

“ The mountain of thine inheritance,” alludes to Mount Moriah, or Sion, where Moses knew that God would fix his sanctuary ; and which is prophetically spoken of here as already completed.

‘ The whole army seem to have joined with one voice in this song ; and Miriam and all the women re-echoed it with equal rapture ; yet, while almost in the very act of expressing their gratitude, this capricious people began to murmur because there was a scarcity of water in the wilderness through which it was necessary to pass ; and because, when they did come to a spring, the water was bitter. What a beginning for the new life on which they were entering ! Let us act more wisely, my dear children ; and, grateful for the blessings of the past, let us endeavour to deserve their continuance through the new year on which we are entering.’

We endeavoured to trace the march of the Israelites on the map. My uncle showed us that the wilderness of Shur was a part of that great sandy desert which divides Egypt from Palestine ; and which stretches from the Mediterranean to the head of the Red Sea on both sides. It is supposed by the late celebrated traveller, Burckhardt, that the place, called Marah, from the bitterness of its water, is the present Howara. Its distance from the Red Sea corresponds with the three days’ march of the Israelites ; and there is a well there, of which he says, ‘ The water is so bitter, that men cannot drink it ; and even camels, if not very thirsty, refuse to taste it.’ Irwin, another traveller, says that, in travelling 315 miles in this desert, he met with only four springs of water.

My uncle says that Moses does not mention every place where the Israelites encamped between the Red Sea and Mount Sinai, but those only where something remarkable occurred. Elim, with its refreshing wells and shady palm-trees, must have been delightful in comparison with the desert they had passed. Dr. Shaw, who visited that country the beginning of last century, found nine of the twelve wells described in Exodus ; the other three had been probably filled up by those drifts of sand which are so common in Arabia. But the palm-trees alluded to by Moses had increased amazingly, for, instead of threescore and ten, there were then above two thousand. Under the shade of these trees he was shown the *Hammam Mousa*, or the bath of

Moses, for which the inhabitants have an extraordinary veneration, as they pretend it was the exact spot where he and his family encamped. From this place the Doctor could plainly see Mount Sinai, or, as it is called in some parts of the Bible, Mount Horeb. This seems to have been the general name of the whole mountain, while Sinai was appropriated to the summit, which had three distinct elevations: on the western one, God appeared to Moses in the bush; the middle one, which is the highest, is that on which God gave the law to Moses, and is still called Gebel Mousa, or the Mount of Moses; and the third, and most easterly, is called St. Catherine's Mount, from the monastery which has been erected there.

2nd.—The poor wandering gipsy died in a very few days; and my aunt immediately put her son under the care of the Franklins and the old blind man. Charley is an intelligent little fellow, but will require great care and attention; he speaks a sort of incomprehensible gibberish, and understands but little of what is said to him. The housekeeper asserts that nothing can civilize those gipsies, however early they are taken in hand; but my aunt will try what mildness and steadiness can effect: she has desired him to be treated very gently, and his faults rather overlooked, till he can be made to understand the value of a good character. My uncle has written about him to some of his mother's relations; but unless they are capable of taking care of him, he will not abandon the child. Mary and Caroline have bought some clothes for him, and as just now I have no pocket money, not having managed my last quarter well, I begged to be allowed to contribute time and work.

What an extraordinary thing it is, that these odd people, the gipsies, should have been wandering in the same unsettled manner about the world for three centuries; and always the same dishonest impostors. My aunt showed us a passage in Clarke's Travels, about the gipsies of Wallachia—where he says, though they are as well inclined to steal as the rest of their tribe, they are certainly of a more civilized nature. They are divided there into different classes: some are domestics, and are employed in the principal houses; others work as goldfiners and washers; some travel about as itinerant smiths; some as strolling musicians; and others are dealers in cattle. They are skilful in finding gold, and smelt it into small ingots;

using for that purpose little low furnaces, which they blow by a portable bellows made of a buck's skin. The construction of the bellows is very simple; an iron tube being tied into the neck of the skin, which is sewn up, and two wooden handles are fastened to the legs by which it is worked.

I was very curious to know what could be the origin of these people, and why they have been always wandering about. My uncle told me, that ever since the beginning of the fifteenth century, when they were first noticed in Europe, the general idea has been, that they were Egyptians. It is said, that when Egypt was conquered by the Turks, several of the natives refusing to submit, revolted under one Zinganeus, and afterwards dispersed in small parties all over the world.—From their supposed skill in magic, they were well received; and, being joined by idlers in every country, they became so troublesome, that measures were taken to expel them from England, France, and Spain. It is a remarkable coincidence, my uncle says, that in Turkey the gipsies are called Tcheeganes; in Italy, Zingari; and in Germany, Zigeuner; all which seem to be derived from the name of their first leader in Egypt: but, on the other hand, they are sometimes found wandering about in that country, apparently a distinct race from the natives, and without the least affinity to them in features, customs, or language.

Attempts have been made to prove that they have come from India; and it is said that, near the mouth of the Indus, there is a people called Zinganès. A learned German also has traced several points of resemblance between the common language of the gipsies and the dialect of a district in Hindostan; for instance, all words ending in *j* are feminine in both languages, and both add the article to the end of the word.

These extraordinary creatures, my uncle added, may be found in every country, from the western extremity of Europe, to the easternmost parts of Siberia; and in all preserve their wild, strolling habits, their filthy modes of eating, try the pretended power of fortune-telling, their expertness in wells descents, and their love of intoxication.—In each country they elect a chief, whom they dignify by some title, such as king, count, or lord, though increased amenable to his will; and, as one set-off again were then about vices, they are generally extremely fond of

3rd.—Mrs. P. has been here now for several days, which have been happy days to all, for she is so pleasing and gentle, and so mild, that all like her.

She told me yesterday one thing, which, though it may look like vanity to repeat, yet I know will gratify you so much, my own dear Mamma, that I cannot conceal it. She says, that she thinks me improved in many respects in the few months that have passed since I left her. ‘Very much in your manner and carriage; and, above all,’ she added, ‘you seem to have lost the appearance of indolence that you had. I am rejoiced to see that you have acquired that power of exertion, which is so useful, both to young and old—and that you have the will, as well as the power, to conquer little habits that are disagreeable to your friends. I know,’ said she, ‘you will excuse me for saying this; for I feel a real interest in your welfare, and I have myself suffered so much from a foolish indifference to the opinion of others about what I considered *trifles*, that I am always pleased when I see young people endeavour to avoid the rock on which I split.’

I could not help showing some surprise at this, for I thought it very unlike her character; and though I did not venture to express any curiosity, I suppose she saw a little in my countenance, for after some more conversation she said, that she would give me a little sketch of her life, because she thought I might derive some advantage from it.

We had not time to begin then—but I hope we shall to-morrow. In the mean time I must not forget to tell you, lest you should think I had lost all honourable principle, that I immediately informed Mrs. P. of the kind of journal which I send to you—and asked her permission to relate to you what she tells me; ‘but,’ said I, ‘if you disapprove I will not mention it.’ She replied, ‘You are perfectly welcome to tell her everything—for I very much disapprove of any confidence being made to a young person that is to be concealed from her mother.’

5th.—There was a lively little discussion last night, on the want of originality in poetical ideas; and on the manner in which the same thought is repeated by one author after another; each altering it, as my uncle said, in the same way that an object is seen through glasses of different colours. Or, said my aunt, with its original strength weakened by each repetition, like the successive reflections of the

same object from a number of mirrors. And, though I did not venture it below stairs, you shall have my simile: like the *Fata Morgana*, where the objects reflected from the surface of the sea are again reflected from the clouds, but less distinct and generally inverted.

The conversation was begun by my uncle and aunt, and Mrs. P., and by degrees my cousins joined. A great distinction was made between gross plagiarism, and the borrowing a part only of an idea which the author weaves up with something new, and then places in a new light.

My aunt brought, as an example, these lines in the 'Lady of the Lake':—

The sun, awakening, through the smoky air
Of the dark city casts a sullen glance,
Rousing each caitiff to his task of care,
Of sinful man the sad inheritance ;
Summoning revellers from the lagging dance,
Scaring the prowling robber in his den ;
Gilding on battled tower the warder's lance ;
And warning student pale to leave his pen,
And yield his drowsy eyes to the kind nurse of men.

She said, these lines seemed to have been produced, perhaps, unconsciously, by a speech of Shakspeare's Richard II.

————— Know'st thou not,
That when the searching eye of heaven is hid
Behind the globe, and lights the lower world,
Then thieves and robbers range abroad unseen,
In murders, and in outrage bloody, here ;
But when from under this terrestrial ball
He fires the proud tops of the eastern pines,
And darts his light through every guilty hole,
Then murders, treasons, and detested sins,
The cloak of night being pluck'd from off their backs,
Stand bare and naked, trembling at themselves.

In this case they all agreed, that an author might insensibly dwell on an idea, alter, dress, and add to it, till he was no longer aware whence the original thought had come—as in a large company, a single word which happens to come to our ears from a group in another part of the room produces sometimes an interesting conversation, though none of the party engaged in it know well how it began.

Mrs. P. said that similar turns of thought and expression may be traced back through the whole chain of poets ; and that if Homer appears to be an original genius, it is because we cannot now compare him with his predecessors.

Few of our old writers were less exposed to the charge of borrowing than Spenser, and yet she could not help imagining that the Persian tale of Fadlallah was the origin of those pretty stanzas in the Faërie Queene, where the dove who watches over Belphebe and her despairing swain, contrives that they shall once more be reconciled.

Mary said she thought it had more resemblance to the story of Camaralzaman, in the 'Arabian Nights,' who was enticed from hill to hill in pursuit of the bird who had carried off the princess's talisman. 'That cruel bird,' said she, 'leads Camaralzaman away only to separate him from his beloved princess; but the same idea in Spenser's hands becomes a hundred times more beautiful. The dove is represented as the constant and tender companion of the youth who had long languished in grief for the loss of his Belphebe; his "dole" is soothed by the caresses and sympathy of the bird; and at last, in order to gaze at a ruby heart, which she had given him in happier times, he fastens it round its neck. Away flies the kind-hearted dove, who gains the notice of Belphebe, and gently winning her forward in pursuit of the well-known ruby, succeeds in restoring the long-parted lovers to each other.'

Mrs. P. acknowledged that Mary's opinion was more just than her own; and my aunt, looking at me, said, 'I think I see in Bertha's countenance that she has not read the Faërie Queene: suppose, Caroline, you were to refresh our recollections, and read those pretty stanzas for your cousin.'

Caroline did so; and as I know you have not Spenser among your books, and as his old-fashioned style will amuse Marianne, I will transcribe the two last stanzas, where Belphebe, attracted by her jewel, follows the benevolent bird.

She, her beholding with attentive eye,
At length did marke about her purple brest
That precious juell, which she formerly
Had knowne right well, with colour'd ribbands drest:
Therewith she rose in hast, and her addrest
With ready hand it to have reft away;
But the swift bird obeyd not her behest,
But swarv'd aside, and there againe did stay;
She followed her, and thought againe it to assay.

And ever when she nigh approcht, the dove
Would fitt a little forward, and then stay
Till she drew neare, and then againe remove;
So tempting still her to pursue the prey,

And still from her escaping soft away,
Till that at length into that forrest wide
She drew her far, and led with slow delay;
In th' end she her unto that place did guide
Whereat that woful man in languor did abide.

7th.—My curiosity about frost has been gratified. Each of the last three nights the thermometer has been below the freezing point—last night it was 28° . The ground is hard, and grass, trees, and shrubs, are quite white. Nothing can be more beautiful—each blade of grass sparkling with gems, every branch and spray covered with delicate crystals, and the leaves of the fir-trees hanging like little miniature icicles.

I asked my uncle where the frost comes from. 'It is in fact,' said he, 'frozen dew; when the ground is cooled down to 32° , the dew deposited on it is congealed, and becomes hoar frost. This often happens when the temperature of the atmosphere is much higher; and I have seen a copious hoar frost in a clear calm night, though the air was not colder than 40° .'

When I begged my uncle to explain that, he told me that, from the satisfactory observations of Dr. Wells, it appears that the heat which the earth receives from the sun in the day is returned or *radiated* back again from the earth during the night, and is dispersed in the sky; the surface of the earth thus becomes cold from its sudden loss of heat, and congeals the dew. The cold produced by this radiation of heat from the earth is always less if any substance be interposed between it and the sky; not only a solid body, but even a fog, or clouds have this effect, because they intercept the heat, and, perhaps, again send back a portion of it to the earth; and this, he added, is the reason why a bright clear night is generally colder than a cloudy night.

I asked my uncle if that was also the reason that such light substances as straw or mats are found to protect tender plants from cold?

'Yes,' said he; 'I used to wonder how such thin, open things as Russia mats could prevent plants from becoming of the same temperature as the atmosphere; but when I learned that all bodies at night gave out their heat by radiating it, unless some covering be interposed, which acts, not by keeping out the cold, but by preventing their heat from flying off, then I perceived the reason of what before had appeared to me to be almost useless.'

He described several experiments he had tried to satisfy himself on this subject. He found that even a cambric handkerchief was sufficient; and that when raised a few inches in the air, the warmth of the grass beneath was 3° greater than that of a neighbouring piece of grass which was sheltered by a similar handkerchief actually in contact with it. All his experiments confirmed those of Dr. Wells, and showed that by placing substances for the shelter of plants, not directly touching them, the effect was increased. Snow acts in the same manner as a preservative of plants when the ground is not already frozen.

Some other experiments my uncle then described, and he endeavoured to make me understand Dr. Wells's general opinions on the formation of dew. He also mentioned the curious method they have in India of forming artificial ice in earthenware-pans, where the temperature of the air is even 12° or 14° above the freezing point. He concluded by saying, 'I do not tell you all these particulars, Bertha, merely to stuff your memory with philosophical shreds and patches, but to excite your mind to observation and inquiry, which is a hundred times more useful.'

WEEK 23.

The Ephod—Mysteries not necessary for us to know—Hoar-frost—
Effect on Lumps of Clay—Tobacco—Eggs of the Humming Bird
—Pillars of Ice—Form of Icicle—Leaves appearing on the Window.

Jan. 8th.—Sunday. The *Ephod* being mentioned in a part of the Scripture I was reading this morning, I asked my uncle to describe it, for I had but a confused idea of the dress of the high-priest. He says the name is derived from a Hebrew word, signifying *to tie*. It was made of linen, and brought from behind the back over each shoulder; and then crossing the breast, it was passed round the waist so as to form a girdle, the two ends hanging down before. The *Breast-plate of Judgment*, which was so called because the high-priest wore it only when he went to consult the Divine Majesty, was made of the same materials as the ephod; and being two spans in length by one in breadth, it formed a square when doubled. The span, he says, was half a cubit, or about ten inches.

I then begged of my uncle to explain the nature of the

Urim and Thummim. He told me that the words signify *light* and *perfection*; but as Moses does not appear to have received directions for making them, it is impossible now to form any distinct idea of the materials of which those sacred ornaments were composed, or of the manner in which they were employed, in order to obtain answers from the mercy-seat in the Tabernacle. The opinions of the learned have therefore been very various on those points: the Jews think they consisted of precious stones, which were so arranged, that the partial brilliancy of certain characters engraved on them pointed out the required reply. Others suppose that they were merely parts of the grand dress, which qualified the high-priest to present himself in the holy place on great occasions. But the question is of little importance to us; like many other mysteries attending the Divine ordinances, we vainly endeavour to penetrate their meaning: we may, however, feel assured, Bertha, that if it were necessary that these things should be understood by us, they would have been fully explained. Many ceremonies in the ritual given to the Israelites were adapted to them as a people who had lived amongst the heathens, and who had imbibed those prejudices and depravities of heathen worship, which were so totally removed from every thing spiritual. To us they may be objects of rational curiosity; but a knowledge of their use or precise fabric could add no essential testimony to the well-established truths of Scripture History.

‘There is, however, one mode of viewing the subject, from which we may derive a useful hint: the high priest could not address the Almighty when divested of this emblem of light and perfection; in like manner our addresses to God will be of no use, unless we also are adorned, not indeed with the *emblem* of light, but with the true light of the Gospel; with that clear and bright faith which makes us feel the power and goodness of Him to whom we pray.’

9th.—The beautiful hoar-frost at first gave to every twig and blade of grass the modest, quiet appearance of a wreath of pearls; but last night there was a slight shower of rain and now every thing is glittering like diamonds. We observed, also, another peculiarly pretty circumstance: the wet being immediately frozen, every thing was enveloped with thin transparent ice, through which the leaves and berries and branches, were distinctly seen.

Every shrub, and every blade of grass,
And every pointed thorn seem'd wrought in glass ;
In pearls and rubies rich the hawthorns show,
While through the ice the crimson berries glow.

Already the birds are become tame, and many venture courageously to take crumbs off the window-stones. Poor little birds, this bright clear air, and sunshine, make every body else look gay, while they sit shivering or sadly chirping on the trees ; even the hens and ducks look swelled and melancholy.

We walked to-day to Franklin's farm, and found him taking advantage of the hardened ground, to put out manure ; he had two carts employed, and all the people seemed trying to keep themselves warm by hard work.

The field which had been left to remain *fallow* will be much improved by this frost, he says. It was a coarse, wet soil, full of lumps of heavy clay ; and he showed us how much these lumps were already broken. My uncle said that the soil being thus divided, and pulverised, would be greatly meliorated ; so, as we walked home, I asked him why the lumps of wet clay were broken by frost, which I thought would only have hardened them the more, like the road on which we were walking.

'The reason why the clods of wet earth are burst by the frost, is, that the water which they contain becomes ice ; and, in doing so, it swells, and therefore requires greater space than while it was water. In the process of freezing, water crystallizes, and every crystal drives away the adjacent particles which interfere with its exact formation. This does not happen to hard roads, such as we are now walking upon, because they are closely *bound*, and do not admit the previous entrance of the moisture ; but if the road was soft and spongy, you would then probably see, in its rough and uneven face, the effect of the frozen water. When we return home, if you look at the piece of gravel walk which was lately made, and is not, therefore, yet bound, you will observe what a curious appearance the frost gives it : the larger stones, which by their weight prevented the water from spreading under them, will appear sunk ; while the sandy, spongy part which imbibed the rain is swelled by the frost, and raises the surface of the walk. All crystals have a regular form, and in assuming it, they are obliged to recede a little from each other ; each crystal, it is true, has

but little power, but as their number is almost infinite, their combined power is so great, that what is called in military language a *shell*, that is, a hollow ball of strong cast-iron, if filled with water, and the aperture well secured, will burst when the water freezes. When such is the expansive power excited by water as it passes into the state of ice, we cannot be surprised that jugs and bottles of water are frequently broken in a frosty night—and that water-pipes constantly burst when the frost penetrates to them.'

10th.—The frost was so great last night, that it caused sad mischief. The thermometer sunk to 24°. Mary had two nice hyacinths in bottles; unfortunately, she placed them yesterday in a window where there was a bright sunshine; Frederick having promised to put them back safely in the latter part of the day. He forgot them, but as soon as he woke this morning, he went to repair his error—when, to his great dismay, he found the glasses burst, and the water become lumps of ice.

He went to Mary, but he was so sorry for his negligence, that she could not reproach him. The only thing to be done, she said, is now to consider how to relieve the bulbs from the ice that surrounds them. Frederick proposed placing them near the fire, that the heat might thaw the ice; but Mary told him that she was afraid the sudden change from cold to heat would make the bulbs decay—and that the best plan, she thought, was to put them into cold water. Mary had called me to look at the glasses on the first discovery of the misfortune: and we carried them and the bulbs enclosed in ice to my uncle, who had just come down to the library, to consult him on what was best to be done. He approved of Mary's proposal, and said, 'That is a practical instance of the advantage of acquiring different kinds of knowledge.' Mary had concluded, that the sudden change of temperature would produce immediate decay in the roots—on the same principle that heat, applied to people who have been frost-bitten, causes mortification in the frozen part. My uncle afterwards told me, that the same thing happens to the frozen buds of tender plants which are exposed to the rays of a hot sun before the frost has been dispersed; while those which are gradually thawed receive no injury.

I reminded him of his having spoken of *crystals* of ice, and asked how that term could be applied to anything but mineral bodies.

'The term crystal,' he replied, 'came from the Greek word for ice—it was afterwards applied to rock crystal, which the ancients imagined to be water converted into stone; but it now signifies the regular figure in which the particles of any substance arrange themselves in passing from the liquid to the solid state. Each of those substances has a figure for its crystal peculiar to itself, and from which it never varies. Common salt, for instance, dissolved in water, and slowly evaporated, always forms regular *cubic* crystals of about an eighth of an inch in diameter, and quite transparent; sugar candy is nothing but sugar crystallized into *six-sided* prisms; and alum forms itself into beautiful crystals of *eight* sides. All this you may easily ascertain for yourself by experiment; and when I have an opportunity of taking you to a smelting house, you will see that in the cooling of melted metals each metal assumes a crystalline shape belonging to itself.'

I asked how, and when, all the crystals and precious stones and salts in the world could ever have been in a fluid state.

'One thing at a time, said my uncle: 'that question would lead us quite away from ice. I was going to tell you, that water, in the same manner as salt or metals, when it ceases to be fluid, which happens at the temperature of 32° of Fahrenheit's thermometer, assumes a constant regular form. Now, Bertha,' he said, 'examine this lump of ice, which was in the broken glass, both with and without your magnifying glass—and tell me how it appears.'

I told him, that to my naked eye it seemed as if there were lines crossing and recrossing one another in an uneven manner; but that, with the glass, it appeared like a collection of little spears with pointed ends, laid very closely together and mostly darting from the places where the ice had touched either the bulb or the side of the glass vessel.

'Yes,' said my uncle, 'that is what I wished you to observe;—when ice begins to form on the surface of water, several of those spear-shaped *spicula* shoot from the edge of whatever contains the water, or from any solid body which, happens to be in the water,—a bit of wood or even a straw.

I interrupted my uncle to beg he would explain the word *spicula*—I know he is never displeased at being interrupted by a question of that sort.

He told me that *spiculum* is a Latin word, and means a dart or an arrow, or sometimes the sting of a bee,—*spicula* is the plural, and is commonly used in English to express any small pointed bodies.

‘To return to the ice,’ said he : ‘that first set of spicula serves as bases for a new set, and these again for others ; each single spiculum diverges or spreads from its own base at an angle of nearly 60° , and therefore they all cross each other in an infinite variety of directions, and this process continues till one even sheet of ice is formed.’ I asked my uncle, if the reason why the ice occupies more space than the water was, that those spicula or crystals, from their shape, and from shooting in various directions, cannot lie so closely together as the minute particles of water.

‘Yes,’ said he, ‘you are perfectly right,—a proof of this is, that it requires great power to compress water in the smallest degree ; while the hardest ice, if pounded, may be easily forced into a smaller space.’

We all again examined the formation of the ice in the broken glasses, and I saw the pretty little spicula quite distinctly—we then went to breakfast, leaving the bulbs to thaw quietly in their cold bath.

11th.—After the hyacinth roots were thawed yesterday, they were placed in a warm room ; and we had a great deal of conversation about the different effects of heat and cold, according to the different bodies that are exposed to them. I learned that extreme heat is necessary to liquefy steel, platina, or porcelain ; some metals require far less, and Mrs. P. says she once bought in a toy-shop some spoons made of bismuth, tin, and lead, which melted in a cup of hot tea. The warmth of the skin is sufficient to thaw frozen water. On the other hand, the degree of cold requisite to render mercury solid is very great, while that which forms ice is moderate.

Among vegetables, there are many which resist the strongest frost, and the native trees here have their stems very seldom injured. Most of the herbaceous plants lose their stalks, though their roots remain alive ; and so revive at the return of spring, even after their roots have been frozen.

Ants and flies, and many other insects, fall asleep in very slight degree of cold. Dormice, also, and other animals of the same class, appear as if life was suspended for some

months during cold weather, so much so that their hearts cease to beat. The snail and the toad undergo the same stupefying effect, and serpents can be frozen so as to become brittle; if they are broken in that state, they die; but if left in their holes, into which the warmth of spring penetrates slowly, they recover. It is in the season when their food begins to fail, and the fruits which fatten them disappear, that these creatures conceal themselves, in order to submit to this wise law of nature. Those that are deprived of food by the snow covering the ground, sleep till it melts. The white bear lives on the sea-shore in summer, and on islands of ice in autumn, and he does not fall asleep till the ice, being thickened and raised too high above the water, is no longer the resort of his chief prey—the seal. His means of obtaining food continuing longer, a much severer cold is requisite to deaden in him the call of seeking it, than in the black bear who devours vegetables; or than in the brown bear, who lives on animals who retire earlier than he does. That hunger should thus give way to sleep, when the cold which benumbs them would starve them by famine, appears ordered by that benevolent Providence, who regulates every part of the universe.

My uncle says that something like this is the case in man; when the cold is very violent he becomes insensible; if one of his limbs should freeze he does not perceive it, but, on the contrary, fancies himself growing warmer, and feels such a propensity to sleep, that he is angry at being roused. There are continual instances of this in the northern parts of Europe; and the poor frozen person, if indulged by his companions in closing his eyes for a few minutes, seldom opens them again. He does not, however, die immediately, my uncle says; it is even thought, by some, that as long as the same temperature continued, he would sleep, like the dormouse, deprived of all vital action.

My aunt said, she wondered whether human creatures could be revived, after having been many days frozen, provided similar means were used for their recovery that are employed to restore a frozen limb. Warmth, she said, is applied with the utmost caution, the frozen parts are rubbed with snow, and then immersed in water very little warmer than melted ice. The attempt would be worth making, instead of abandoning frozen people to their fate, she thought; but that as to having the power of sleeping like

a dormouse or a bear, to whom Providence gives that habit, because they have no means of procuring food, she could not believe that possible. 'Man has so many resources, that it was evidently unnecessary to endow him with the capability for sleeping away hunger; but I really believe,' she added, 'that there are people of such inveterate indolence, that they would sleep for several months, to relieve themselves from all care, if they had the power of voluntary torpidity.'

My uncle replied, that doubts have been expressed whether it was in any case a voluntary power: it is asserted that animals never yield to torpidity till driven to it by necessity; and that many of those lethargic animals, while existing during winter on their accumulated fat, which is gradually absorbed into the system, retain the use of their faculties. The cricket is one proof that animals do not submit to it from choice. This insect passes the hottest part of summer in crevices of walls and heaps of rubbish; about the end of August it quits its summer dwelling, and endeavours to establish itself by the fireside, where the comforts of a warm hearth secure it from torpidity. He then mentioned a colony of crickets which had taken up their abode in a kitchen, where the fire was discontinued from November to June, except one day every six weeks. On these days they were tempted from their hiding place, and continued to skip about and chirp till the following morning, when they again disappeared in consequence of the returning cold. This fact, which he was told by an ingenious friend, shows that in crickets at least torpidity depends on circumstances; and perhaps other sleeping animals, he says, have the same accommodating faculties.

Mrs. P. amused us with some very extraordinary accounts of toads that have been found in the stems of old trees, so that the wood must have grown round them; and even in cavities of stones without the smallest crack or aperture for any communication with the air. My uncle told her that an experiment had not long ago been tried at Paris on that curious subject: a living toad was enclosed in plaster, and at the end of six months it was alive and strong; but some one having suggested that plaster of Paris, when it is more or less porous, the same experiment has been repeated with the addition of a coat of varnish to prevent admission of air.

Before we separated, my uncle promised to procure for me, if possible, a torpid dormouse.

12th.—You must allow, Mamma, that my journal never detains you very long on any one subject: from polar bears and frozen limbs, we must now skip to tobacco plantations and the West Indies, where you know Mrs. P. resided some time.

My uncle was inquiring from her this evening about the different modes of culture and the proper soil for tobacco. Few plants, she says, are so much affected by situation; it acquires such different qualities from the soil, that tobacco plants which have been raised in one district, if transplanted into another, though not a quarter of a mile distant, will entirely change their flavour. For instance: the Macabau snuff is made from the leaves of a tobacco plant which takes its name from the parish of Macabau in St. Kitt's, and there only the real snuff of that name can be prepared. Both plants and seed have been tried in all parts of that island, and in several of the other islands too, but the peculiar scent has not in any instance been retained.

The tobacco of St. Thomas has also a particular smell, which the produce of no other island resembles. It is a curious circumstance that none of it is manufactured there; it is all sent to Copenhagen, and is returned from thence to St. Thomas, and made into snuff. In Barbadoes they make the highly-scented rose-snuff, which is sometimes imitated in London, by adding attar of rose to fine rapee; but in the island it is made by grating into the snuff a fruit called the rose-apple, which is cultivated for that purpose. It is, however, neither a rose nor an apple, though, when ripe, it somewhat resembles a crab-apple; but it has a stone within, and has at all times a delightful fragrance like the rose. The fruit, when ripe, is gathered, and carefully dried in the shade.

But what interested me much more than all her snuff and tobacco, was the account she gave of some dear little green humming-birds, that used constantly to build amongst the flowers of a convolvulus that grew against the house near her window. She took the greatest pleasure in listening to their little feeble notes, and in watching their rapid motions and all their habits. They were of a smaller species than any of our little Brazilian beauties; and she says the eggs were actually just the size of coriander seeds!

14th.—As I was curious to see the effect of frost on a very wet soil, Frederick and I went this morning to a spot in the low fields, where we knew it was always swampy. We observed that, as we walked there, the ground cracked, and sunk a little beneath our feet; so Frederick went for a spade, and we gently raised up one of the large lumps between two of the cracks. We found very near the surface a thin crust of ice, and under that a forest of minute columns of ice, standing close together like a fairy palace, with rows in it of clustered pillars; for each column was in reality composed of several lesser ones, not thicker than large pins. You cannot think, Mamma, how pretty they were.

When we raised one of these cluster columns with its capital of earth, it separated quite easily from the ground beneath it; but still a thin film of earth remained sticking to the bottom of the column. Frederick brought home a lump of these icy pillars on the spade, and my uncle laid aside his letters, to show, he said, how much pleasure he felt when he saw us in pursuit of knowledge. As soon as he looked at our pillars, he said, 'In that sort of spongy soil where you found them, these icy crystals are formed so immediately under the surface, that only a thin crust of earth remains over their tops; and the film of clay, which sticks to the bottom of the column, shows you that the frost has not penetrated below it, but that the earth beneath continues soft. I see you are looking at those marks across the pillars; break the column at one of the marks.'

I did break one, and found exactly such a film of earth between the two parts of the column, as that which was on the bottom of it. I asked how could earth get into the middle of the crystal?

'Each division,' said my uncle, 'shows a separate crystal—each crystal was formed in one night,—and the number of joints or interruptions in the column show how many nights we have had frost.'

I reckoned four divisions in each column; the uppermost was the longest, the next shorter, and so on; and pointed out that circumstance to my uncle.

'That,' said he, 'is easily accounted for; what quantity of moisture there was in the ground at first, that must have been less and less every succeeding night, and the length of the columns therefore diminished each night in the same proportion.'

In a short walk that we afterwards took with my uncle, he observed, as we passed the garden of a small cottage on the border of the forest, that it was late to see carrots still in the ground; and Frederick remarked that the earth looked cracked and swelled around them. My uncle asked leave of the cottager to go into the garden, and there we found that several carrots were actually pushed upwards by the icy columns, the tops of which adhered to the crown of the plant, from which the leaves spring. As the additional joints of the columns had formed, they had acted with so much force, as, in some cases, to break the small fibres by which the root is held in the ground; and in others even the end of the tap root of the carrot was snapped asunder.

I took an opportunity of asking my uncle if there are any spicula in an icicle, which looks so transparent and smooth.

He explained to me, that an icicle assumes its smooth conical form from the gradual congealing of the water as it flows down the surface of the icicle. When broken across, he showed me that it was somewhat radiated in the structure, as if the spicula arranged themselves round the axis; and he added that, if I examined a flake of snow, I might see the same appearance.

I next asked him (indeed he is very patient) if it is the shooting of these spicula that causes the beautiful appearance of leaves and flowers on the windows: he said, yes. But why then are the shapes of the leaves so very various?

‘On a calm night,’ he replied, ‘only a close, even network is formed; but the least current of air whirls the moisture into an amusing variety of forms. That icy foliage is generally within-side the window, because our breath contains much moist vapour; and as no room that has doors, windows, and chimneys can be without partial drafts of air, so the spicula are urged together in one place, and irregularly checked in another.’

WEEK 24.

Work of the Tabernacle—Festivals—How Frost kills Plants—Method of protecting tender Plants—Hamlet—The Story Play—The Poor Vaudois—The Marmot—Sir Charles W.—A Thaw.

Jan. 15th.—Sunday. Frederick asked my uncle this morning, why the work of the tabernacle was so minutely described in the Bible.

‘It is supposed,’ he replied, ‘that Moses has been thus exact in relating how the tabernacle was made, in order to show that all was done according to God’s directions, detailed in the preceding chapters; and it is therefore that Moses so frequently repeats the expression “as the Lord commanded.”’

‘In reading the account of the Jewish tabernacle, as well as of the various ceremonies of the law, we should always consider for what ends God was pleased to ordain those things. St. Paul informs us that the Jewish law was an imperfect dispensation from the first, and added, that, though it was adapted to the weakness of the Jews, its several institutions were intended to typify the more perfect dispensation of the Gospel. Thus, the Jewish high priest was a manifest type of our Saviour; and the ark in the Holy of Holies, with its mercy-seat, from whence God communicated his will, was an emblem of Him from whose mouth we afterwards received the perfect law.

‘The religious services ordained were *sacrifices* of different kinds, and various *purifications*. All these apparently burdensome rites were, however, aptly significant of many things tending to preserve an inward, true religion; such as the constant acknowledgment that all the blessings we enjoy are the direct gifts of God; 2dly, the feelings of reverence due to his temple, and to all the things appropriated to his service; 3dly, the necessity of curbing our passions, and of atoning for past errors; and further, the impossibility of rooting out our evil habits without vigorous exertions. These, and other moral objects of the same nature, were well understood by the Israelites to be specifically represented in the ceremonial law.

‘There were, also, certain solemn *festivals* ordained commemorations of signal national mercies and deliverance. Nothing could have been better calculated to keep alive

spirit of gratitude to the bountiful Author of those mercies ; and that nothing could be more consistent with the feelings of the human mind, has been exemplified by the practice of every age and nation, in the anniversary observances of religious, national, and domestic events.'

16th.—The frost still continues ; and, instead of being miserably cold, as I expected, I almost enjoy it. There is not much wind, and the air feels dry and clear. We take long quick walks, in the bright part of the day, while the sun shines. The rooms are very comfortable, and I find, as my aunt told me, that I am less chilly when I stay at a moderate distance, than when I sit quite close to the fire. In the latter part of the day, if we begin to grow cold, after the glow of warmth produced by walking is gone, we take some good house exercise, and that always brings it back.

Frederick asked my uncle to-day, whether it is by the loosening of the earth round the roots of plants, as we saw last Saturday had happened to the carrots, that frost kills them ?

'Perhaps,' said he, 'that may have some injurious effect upon tender plants ; but it is by bursting the sap vessels that frost does the most mischief.'

'I suppose the sap freezes, and that its expansion bursts the vessels,' I said.

'Just so,' replied my uncle ; 'this frequently occurs, even in moderate frosts, to tender plants, especially if they are succulent. But in very severe winters, even forest trees have suffered. In the great frost of 1739 and 1740, the largest branches were split from end to end, and numbers of the most hardy trees died in consequence.'

All this made me very anxious about my garden and my nice plants ; I had already put stable litter on them ; and I asked my uncle, if that should be frozen through, what he would recommend me to do.

He advised me to bend some long withies of willow over them, so as to leave a small space above the surface of the litter, and over the willows to spread either a mat or fir boughs ; and he reminded me that he had explained, some days ago, the use of this process.

'Besides,' said Mary, 'I believe the stillness of the air under the covering helps to delay the freezing of the moisture in the ground. I recollect that the winter before last, which was very severe, Mamma had fir-branches hung on

the wall to cover her tender climbing plants, and long stiff straw or fern was lightly strewed round their roots, and they all lived through the winter, and looked healthy and beautiful in summer.'

My uncle told me, for my satisfaction, that a long frost, if not very intense, is less injurious to tender plants, than a milder season in which soft weather and frost alternate: in open weather there is a tendency in the sap to rise; and if it is checked by succeeding cold, the sap-vessels are injured, and the plant becomes sickly, or decays.

'Is that,' said Frederick, 'the reason why spring frosts are more hurtful than those of winter?'

'That is the principal reason; but you must also consider that the ground, during the previous summer, had absorbed a great quantity of heat, which helps to mitigate the winter's cold: this has been all expended before spring, and, therefore, the whole force of the cold is then felt.'

Frederick said he remembered hearing Mr. Grant mention last autumn that all the potatoes had been injured by frost in Alney Valley, near Gloucester, while those on the side of the hill had quite escaped; and, as he thought valleys must be warmer than hills, he begged of my uncle to explain the cause.

'Valleys,' he was answered, 'are more sheltered from the wind, and the air in them is undoubtedly hotter in the day-time than that on exposed high grounds. But in autumn, when the nights become cold, and slight frosts occur on the sides of the hills, the air that is cooled there being heavier than warm air, sinks down into the lower grounds, displaces the warm air, which rises, and accumulates in the bottom of the valley.'

'There is another reason why, on clear nights at least, the cold is more severe in low, confined places that are sheltered from the wind. The radiation of heat into the sky, which I lately explained to you, reduces their temperature below that of the air, except what is in immediate contact with them; and there being no wind, there can be no circulation of the warmer air, to replace the heat they have lost.'

17th.—Hamlet was mentioned yesterday after dinner a great deal was said about it, and many different opinions were expressed. At last, to my great vexation, my uncle observed that I took no part in the conversation.

‘Come, my little Bertha, we must have your opinion, pro or con; are you one of those who overlook the merits to mark the faults? Tell me what you think.’

This direct question of my uncle’s was really terrible; every one was silent; and I was obliged to acknowledge that I had only read Hamlet once, not having felt as much interest in it, as in many other tragedies of Shakspeare. There was something which appeared to me a little confused in the whole plot—the ghost, too, disappointed me; and Hamlet seemed unnecessarily unkind to poor Ophelia—and, in short, I did not very much like the play, perhaps because I did not understand it.

My uncle praised me for having courage to express honestly what I thought; and he said he would read the play to us, that I might enter into the spirit of it while the conversation was fresh in my recollection. He had taken but little part in the conversation, his object being rather to draw out all our opinions, than to influence them by his own; but as he was going to begin, he said, ‘It appears to me that Hamlet is not quite suited to very young people; it scarcely comes within the range of their views of the human mind. One of the earliest critics on Shakspeare remarked, that Hamlet “can only please the wiser sort;” and I will therefore endeavour, by a few hints, to direct your attention to the main object of the play, and to one or two objects most worth noticing. Unless young people learn how to see and think for themselves, liking or disliking becomes the mere effects of caprice or fashion.’

‘In this play, Bertha, the object of chief interest is not the plot, nor even the events—it is character. The reader easily anticipates the story, and feels no great suspense as to the fate of the king or queen; and though our love of justice naturally makes us rejoice in the punishment of vice, almost all our feelings are absorbed by the character of Hamlet—the impulses of his noble mind, and the indignation he feels at unexpected wickedness.’

‘The passions of the various persons in this drama are displayed with equal truth and strength. Hamlet’s grief and horror at the death of his father, and at his mother’s baseness, are beautifully and naturally expressed. He feels as a virtuous and honourable man, but he feels also as a son; and in those contending feelings lie the great interest of the piece. Even in the utmost vehemence of his indig-

nation, his manner of treating his mother is remarkable ; and, as some writer has observed, it is that which chiefly distinguishes his character from that of Orestes, and shows, indeed, in the difference between those two heroes, the opposite principles of the Christian and the heathen authors.

‘ As to his madness, you may perceive that it was feigned, in order to prevent all suspicion, on the part of the king, of the enterprise he was engaged in ; and to confirm that idea, he affects a severity of conduct towards Ophelia, in direct opposition to his former sentiments. In the distracted state of his mind, he could not possibly explain to her the cause of his suspended affection. His pleasure was to think, not to act ; and all his principles of action were unhinged by the harassing scene around him. Though he contrived the scene in the play to prove the truth of the ghost’s suggestions, yet he appears to rest satisfied with the confirmation of his suspicions, and declines to act upon them. But, though his character does not show strength of will, it is everywhere marked by quick sensibility, and refinement of thought.

‘ The other characters have also great merit. Ophelia is beautifully painted ; her love, her madness, and her death, are described with the truest touches of tenderness and pathos. Polonius is an excellent representation of a large class of men, who talk wisely and act foolishly. The advice he gives his son is sensible, while that to the king and queen respecting Hamlet’s madness is ridiculous ; but the one is the sincere advice of a father, the other that of a meddling and officious courtier ; and throughout this part Shakspeare keeps up the nice distinctions between the understanding, the habits, and the motives of mankind.

‘ The plot of this play may be, as Bertha says, confused, and the catastrophe, as Johnson tells us, not very happily produced by the awkward exchange of weapons ; but if you study it as a display of character, you will discover fresh beauties every time you read it ; you will perceive that it is of a higher order of dramatic paintings than many of Shakspeare’s more popular works, and that it abounds in the most eloquent and striking reflections on human life.’

18th.—The Lumleys arrived yesterday, my aunt having invited them to meet Mrs. P. I feel very glad, indeed, to see them again, and I am not this time out of humour with interruption from visitors

We amused ourselves part of yesterday evening with *story play*, which I had never heard of before. You are to whisper a *word*, which must be a substantive, to the person who begins the play, and who is to tell a short story or anecdote, into which that word is to be frequently introduced. It requires some ingenuity to relate the story in so natural a manner, that the word shall not be too evident, and yet that it may be sufficiently marked. When the story is finished, each of the party endeavours to guess the word, and the person who discovers it tells the next story. I will give you a sample.

It was decided that my aunt should begin; Frederick whispered the word; and she began so naturally about a visit from Mr. Arthur Maude, who has just returned from Italy, that, at first, I thought she was not going to join in the play.

'Mr. Maude tells me,' continued my aunt, 'that he has been greatly interested by the Vaudois, and well repaid, by seeing those amiable people, for the fatigue of making that part of his tour on foot.

'In a beautiful valley between Pignerola and La Tour, he observed a small open arch, under a group of oak trees, that stood on a round green knoll. He afterwards learned that this arch had been erected about the time that the poor Vaudois had been obliged to quit their native hills, under the brave and pious Arnaud. It was ornamented with figures of saints, and had such an uncommon appearance among those wild valleys, that he sat down to make a sketch, not only of the arch, but of the picturesque scene which surrounded it. Twice he began, and twice he was interrupted by sounds of distress, which seemed to come from within the arch. On approaching it, he found a young creature about fifteen, seated under the shade of the arch, and plying her distaff diligently, while the tears fell from her eyes. In reply to his inquiries as to the cause of her grief, she timidly told him, that her poor old father had been so ill that he could earn nothing for many weeks; and having already been reduced to sell everything but his house, he was totally unable to pay one of the heavy taxes which was now demanded from him. She had, therefore, been spinning—spinning—for ever with her distaff, but all in vain; her yarn was not ready, they must pay the tax without delay, and to do so she must part with the only

treasure she possessed ;—that was the cause of her sorrow ; and she retired to that little arch to avoid the sun, and to conceal her tears from her father.

“ For that one thing, I can get money enough,” said she, “ but how can I part with it ! It was once the Bible of Henri Arnaud ; my grandmother gave it to me, saying, ‘ Never, never part with this precious book, Janetta.’ But, what can I do ? ”—and her tears burst out afresh. “ I *must* sell Henri Arnaud’s Bible, or my father will have no house to shelter him ! ”

Mr. Maude asked her to guide him to her father’s cottage. She took him by a winding path which led from the arch, to a very poor little chalet, overhung by chesnut trees. The old man was seated on a bench at his door : and Mr. Maude, placing himself at his side, and entering into conversation, observed how much his pale countenance brightened at the interest with which a stranger listened to his anecdotes of Henri Arnaud. Mr. Maude indulged himself by giving a small sum, which was sufficient to pay the tax. And having thus enabled the little Janetta to keep her valued Bible, he returned, I am sure, with a happy mind, to finish his sketch of the picturesque *Arch*.’

Mary readily guessed that word, and my aunt therefore whispered one to her. After considering for a moment, she proceeded—‘ The Alpine Marmot, you know, is one of those animals that pass a portion of the year in a torpid state. It delights in cold, mountainous regions, where it burrows in the ground, and prepares its wintry residence with great art, lining it with the finest grass. To collect this grass, the whole family, it is said, act in concert ; some are employed as sentinels, to give notice of approaching danger ; others cut it ; and when a sufficient quantity is gathered, one of them acts the part of a waggon, to carry it home. This marmot lays himself on his back, stretches his legs upward, and suffers himself to be loaded just like a waggon of hay. One set then take hold of him by the tail, and drag him along on his back ; while another set act as guides to prevent accidents, or to remove any roughness in the path, which might overturn their little living waggon.’

My uncle having rightly guessed the waggon, he next called before the house ; Mary first giving him the text-word.

‘ I would readily gratify with a tale all the friends of

lected here to be amused ; but, alas ! not having been gifted with invention, by the fairy presiding at my birth, I can offer you nothing but an historical fact : I can vouch, however, for its fidelity, as I had it from the lips of the person to whom it occurred.

‘ When Sir Charles W. was ambassador at the court of St. Petersburg, he found that the intrigues of a party in the Russian cabinet were all directed against our interests ; and, with his usual promptness, he wrote despatches to communicate the circumstance to his own government. These despatches were treacherously obtained by the Russians ; but as they were found to be in a secret cipher, they were incomprehensible. By the most culpable want of fidelity, however, in some of Sir Charles’s household, it was discovered that the *key* to this cipher was pasted on a screen, which he kept carefully locked up in a closet, within his own bed-room ; yet, in spite of this precaution, some artful person contrived to get in there, and was thus enabled to decipher his despatches.

‘ The following night, he was awakened by his friend, General Rostopchin, who, with the courage and fidelity of real friendship, risked every thing to warn him of his danger.

“ Fly, my friend ! ” he exclaimed, “ your despatches have been read — the council is now sitting, and it is resolved that you shall be seized and sent to Siberia. Every moment’s delay increases your danger. I have prepared everything for your escape ; the British fleet is off Cronstadt, and now only can you get on board.”

‘ The friendship of this generous Russian had even triumphed over the fidelity which he owed his own sovereign. But Sir Charles, though full of gratitude, refused to take his advice.

“ I am here,” said he, “ as the representative of the British King : and never can I so forget his Majesty’s dignity, as to fly from danger. They may send me to Siberia, at their peril ; but I never will voluntarily quit my post. I will immediately appear at the council, and assume my place as the ambassador of England.”

‘ With the utmost expedition he arose, and prepared to appear at the Russian council ; but with a presence of mind like Lord Nelson’s, when he waited to seal his letter with wax, that it might not appear written with precipitation, Sir Charles dressed himself with the utmost precision,

in full court dress, to show that he felt perfectly at ease. When he entered the council-chamber, all his enemies seemed to shrink—no one ventured to intercept him as he advanced to the Empress. She received him graciously, and, extending her hand to him, looked contemptuously at those around her, saying, "I wish I might possess such a minister as this British ambassador; on him, indeed, his master can justly rely for courage and fidelity."

Wentworth guessed the particular word in this interesting anecdote; and a new one having been whispered to him, he begged leave to tell us a traveller's story:—

'Mr. Scouler, in his voyage up the Columbian river, came to a curious rocky hill, called Mount Coffin, by Captain Vancouver. These rocks appeared to be the burial-place for the natives of an extensive district; from dread, as well as respect, the Indians are in the habit of depositing their dead at a considerable distance from their dwellings. The bodies were placed on the rocks in canoes, which served as coffins, and which were covered by boards and secured by great stones. Into these canoes, or more properly speaking, coffins, their disinterested relations, unlike hungry heirs in more civilised countries, had crammed all the valuable property of the deceased. Mr. Scouler mentions as a remarkable circumstance, that a large serpent, which you know is the emblem of immortality, issued from one of the coffins, as if to warn off all intruders from that sacred spot. Perhaps,' continued Wentworth, 'the Indians have some confused idea of the river Styx, and think their deceased friends will be the more readily ferried over to Paradise from being placed in a canoe instead of a coffin.'

Mr. Lumley was very much pleased with the manner in which Wentworth had performed his part, and having of course guessed the coffin, he was next brought forward.

'My mother,' he said, 'had a dream soon after I was born, which she afterwards told me, and which still remains fresh in my memory. She imagined that an angel appeared and told her that her new-born son might possess all the qualities of both heart and understanding for which she had so ardently prayed; "but," added he, "you have omitted in your petitions to ask for one power of the mind without which all acquirements lose their value, and even the best feelings of the heart will be rendered useless."

Now is the time to repair your error—ask quickly for that essential blessing for your boy, and you shall have it.”

‘My mother’s heart beat high; her thoughts became so much confused, that it was some time before she could command them sufficiently to decide upon what this nameless treasure could be. She fancied she heard the quivering of the angel’s wings, as he rose into the air to depart; and, in an agony of despair lest she should lose for ever this precious gift, she struggled to utter the wish which now was uppermost, but, in her effort to speak, she awoke.

‘Now tell me, my friends, what was the wish that trembled on her lips, and you will have my word.’

‘I guessed it, and told some dull story which is not worth repeating; the rest of the company told theirs; but as I have not time for all, I will go on at once to Caroline, who, with a pretty little blush, thus began:—

‘Three young children were coming down the Mississippi with their father in a sort of a boat, which they call there a pirogue. They landed on a desert island in that wide river, in a bitter snowy evening in the month of December; their father left them on the island, promising to return after he had procured some brandy at a house on the opposite bank. He pushed off in his little boat to cross the river, but the wind was high, and the water rough.—The children watched him with tears in their eyes, struggling in his pirogue against the stream, till about half way across, when they saw the boat sink—and never more saw their father. Poor children! they were left alone exposed to the storm without fire, shelter, or even food, except a little corn.

‘As the night came on, the snow fell faster, and the eldest, who was a girl of only six years old, but very sensible and steady for her age, made her little sister and her infant brother creep together close to her, and she drew their bare feet under her clothes. She had collected a few withered leaves and branches to cover them, and in this manner they passed the long winter’s night. Next morning she tried to support her poor weeping companions by giving them corn to chew, and sometimes she made them run about with her, to keep themselves warm.

‘In this melancholy state, you may imagine what was her joy, when, in the course of the day, she discovered a vessel—no—a boat, approaching the island. It happily

contained some good-natured Indians, who took compassion on the children, shared their food with them, and safely conveyed them to New Madrid in their own boat.'

The mistake that poor Caroline made in saying vessel for boat, and then correcting herself with a little confusion, betrayed her; so that, the moment she ended her story, every one exclaimed, 'Boat!' 'Boat!'

19th.—In the morning we had a shower of hail, and, since seven o'clock, it has been snowing constantly the whole day. I am delighted with its pure, beautiful, feathery appearance; besides, it has brought back to my mind little shadows of things that happened before we left England. The ground all white, and the large blazing fire, remind me of the time when we were at Montague Hall, when my grandfather used to employ me to gather the crumbs at breakfast, to put out of the windows for the poor little starving birds. I believe it was that circumstance that gave me such a love of birds; for I am sure I can recollect the happiness I used to feel when feeding them along with good grandpapa, and watching all their little motions.

My uncle was amused with my exclamations of delight at the snow, and he was good enough to show me that each flake has a star-like appearance, consisting of five or six rays that diverge from the centre; and that from each of these rays, little *spicula* shoot out, which, by crossing each other, form a beautiful net-work. He says that when clouds are formed at such a height in the air, as that the temperature there is below 32°, the particles of moisture become congealed or frozen. If the particles are small, or if they are slowly frozen, they become snow, which gradually descends to the earth; but it often happens that the atmosphere near the earth is so warm as to re-dissolve the snow while falling, so that it comes down in the shape of rain. 'This,' he added, 'cannot take place with hail, because it is so much more solid, and falls so rapidly, that the warmth of the lower atmosphere has not time to melt it, before it reaches the ground. In summer, therefore, snow may be formed at a great elevation, as people who have ascended in balloons have more than once witnessed, but it again becomes rain in its descent; whereas, hail, for the reason I have given you, has been known to come down in the hottest months of the year.'

I reminded him that he had not told me why the mois-

ture should sometimes freeze into flakes of snow, and sometimes into the pretty little round balls of hail.

'I waited,' he replied, 'till you asked that question; for information is always best remembered when the want of it is felt. If the particles of moisture in the atmosphere are small, and if they are *slowly* congealed, they form themselves into flakes of snow, as I have already mentioned; but when the moist vapour rapidly collects into large drops of rain, and when these are *suddenly* frozen, they become hail.'

'So that, in fact,' said I, 'hailstones are nothing more than little balls of ice.'

'They are ice, but not common transparent ice,' my uncle said, as he opened the window, and picked out a few hailstones from under the snow; 'you see that they have an opaque whiteness, very different from the appearance of ice. The upper regions of the air are not only always colder, but also less *dense* than those near the surface of the earth; and the white porous nature of hail is owing to the *rarity* of the atmosphere where they were congealed. Professor Leslie has proved this by the simple experiment of freezing small quantities of water in the reservoir of an air-pump from which the air had been considerably exhausted. Hailstones, however, are not always globular, like these; I have seen a shower of irregular lumps of ice of a great size, some of them weighing even three or four ounces, and producing dreadful mischief, killing the lambs, and destroying all the crops. Last summer, there was a partial hailstorm, near London, which broke thirty thousand panes of glass in the green-houses of one nursery-ground.'

I am sorry to add, Mamma, that everybody says it is going to thaw; and there will be an end of all the amusement I have had to-day in looking at the beautiful feathery flakes, as they blew against the windows.

20th.—After dinner this gloomy evening, we had another edition of our story-play. Though very much amused by all I heard, I will only mention two or three little circumstances which may perhaps be interesting to you or Marianne.

The word telescope was whispered to my aunt; and, in the course of her story, she contrived to introduce the tube through which Prince Ali, in the Arabian Nights' Entertainments, saw his distant friends. She said, she had very

little doubt that this must have alluded to some optical instrument, and even that the carpet by which Prince Housian transported himself through the air was of the nature of a balloon. Both these inventions are generally ascribed to the moderns, but she thinks they must have been formerly known in the East, where, indeed, all knowledge seems to have begun.

Mr. Lumley was so good as to join our circle; and having been given the word elephant, he mentioned a laughable anecdote of a man who took hold of an elephant's tail lately in the streets of London. The animal was so displeased by this indignity, that he turned suddenly round, and, grasping the man with his trunk, placed him against the iron rails, where he kept him prisoner for some time. The keeper at last prevailed on the elephant to let the offender go, but not till after he had received some hard squeezes, for which he complained to a magistrate, who, of course, gave him no redress, as he was the first aggressor.

Mr. L. also told us that a friend of his in India, when riding on an elephant, through a rice-field, observed that the sagacious creature plucked a considerable quantity of the ears, and carried them behind his trunk till the party stopped, when he ate them at leisure.

21st.—The expected thaw arrived—yesterday was odious, half snow, half rain, and everything dirty and dreary. My uncle and Frederick went this afternoon to the poor man's garden, where you know we saw the carrots raised up by the little icy pillars; but this thaw has made the roads so wet, that I could not possibly go with them.

Frederick tells me that all the fairy colonnades which supported the earth about the carrots are now melted, the earth has fallen down, and the tops of the roots are to be seen, quite bare, but above the ground, and appearing as if they had been half pulled up by hand.

I asked my uncle if frost pushes up any other kind of root in that way,—and he said that these columns have a quite different effect on fibrous roots, particularly the grasses. In consequence of the strong matting together of their roots, a whole piece of sward between two cracks is sometimes lifted up by these pillars, so as to separate it from the earth underneath. When the columns dissolve the sward sinks into its former place, and the earth, which has been loosened and minutely divided by the freeze

columns, affords a fine bed for the roots to strike into, so that it is rather an advantage than an injury to them to have been thus loosened. After the frost is melted, he says, he has seen patches of the sward lifted up with nearly as much ease as if they had been separated by a parting-spade.

Frederick asked what effect frost had upon soils which are not spongy.

My uncle told us, that in clay soils the water forms small detached crystals, so thickly interspersed through the whole mass, that when a clod is broken, the fractured part looks as if covered by hoar frost; but they are too small for the naked eye to distinguish their shape. They help, however, to divide and loosen the clay in those stiff lumps; and after a frost the blow of a spade will almost reduce them into powder. Farmers, sometimes, in expectation of this effect of frost, sow their wheat in very rough ground in autumn, in order that the clods, being pulverized by it, may close round the roots of the young plants; and these benefit by it as drilled corn does by *landing*—that is, having the earth laid up by the plough against the little seedlings when they have grown to some height. In mild winters, farmers are disappointed in this; but my uncle says it is but a lazy mode of farming, and deserves to be disappointed.

Do you know, Mamma, that I think it is colder and more uncomfortable than during the frost. The birds, however, seem to be rejoiced: I hear them chirping their satisfaction—and all the robins that we had in the house (we had seven at one time) have left their good shelter, and flown off to their companions, by whom I hear they are not likely to be welcomed; I suppose they are despised for not bearing the hardships of the season as well as the others.

WEEK 25.

The Decalogue—Obedience and Worship—The Mississippi—The Dismal Swamp—Levées—Prairie-Dog—Dormouse—Mrs. P. departs—Suspension of Life.

Jan. 22nd.—Sunday. My uncle read the Ten Commandments to us to-day, and afterwards addressed us on the subject; and though I know that I cannot do justice to all he said, I will try and note down a little of it.

“And God spake all these words.” The Hebrews

emphatically called these commandments the "Ten Words;" and the same term having been adopted in Greek, they have obtained the name of *Decalogue* in every modern language. Though all mankind were bound to obey the precepts contained in these important laws, yet as they were more especially addressed to the Israelites, the tables on which they were engraven were preserved in the ark with great solemnity, and were distinguished from the rest of God's ordinances by a peculiar veneration, as containing the covenant of the Lord. The Mosaic dispensation is at an end, but these commandments continue in full force; for we find that our Saviour and his apostles quoted them as matter of perpetual obligation to Christians; who are now, as the Jews were formerly, "the Israel of God."

'In order to understand their full extent, it is necessary, my dear children, that you should *study* them attentively; for, though they are contained in a few brief precepts, they really comprehend a complete code of morality. You must consider that there is much more implied than is expressly ordained; and that each commandment is to be understood as a concise text, reminding mankind of the whole sum of their duty on that particular head. For instance, when any one sin is forbidden, it is evident that every offence of the same nature, though of a lower degree, is also forbidden; and that, as we well know how easily we are seduced step by step, so we are bound to abstain from every indulgence which may act as a temptation to violate the principle of that law. We are not to be contented with a cold and literal obedience to this divine code. Whatever virtues are enjoined to us, it is equally our duty to induce others to practise them; whatever is prohibited, becomes a double crime in us if we tempt others to commit it; and observe, that for this enlarged sense in which we are to view these commandments, we have the direct authority of our Saviour.

'The introduction to the commandments states the grounds on which God required the obedience and adoration of the Jews;—1st, that he was the Lord their God; and 2ndly, that he had triumphantly delivered them from Egyptian bondage. And let it be ever impressed on your minds, that these reasons apply to us Christians, no less than they did to the Jews; for He is the Lord our God by a more excellent covenant than he was theirs. He has relieved us from that slavery, of which the Egyptian bondage was but

type; and, instead of the land of Canaan, he has prepared for us an inheritance in heaven.

'The first and second commandments, in which we are forbidden, under a dreadful penalty, to swerve from the worship of the one true God, or to kneel to any created being, seem to have been framed in allusion to the gross idolatry of Egypt, where all manner of living creatures were adored; and this allusion must have strongly reminded the Israelites of the want of power in those mock deities, who could neither prevent the plagues which they had just witnessed, nor could they enable Pharaoh, though backed by a mighty army, to detain them in that country.'

My uncle then went through all the other commandments, and said a great deal to us about the divine institution of the Sabbath; but when he came to the tenth, 'This,' said he, 'stamps the seal of divinity upon the whole Mosaic code, of which the Decalogue is the summary. No such restrictions are to be found in the laws of the most famous heathen legislators; neither Lycurgus, nor Solon, nor Justinian, interfere with the desires of the heart; they knew that human thoughts are not cognizable by human tribunals; but it was a command which naturally came from Him who both can and will "bring every work into judgment, with every secret thing, whether it be good or whether it be evil." How finely,' continued my uncle, 'has our Saviour commented on this commandment in his Sermon on the Mount! It is not the mere outward observance of the law that he inculcates, but the inward principle of obedience! it is the word of the law written in our hearts.'

23rd.—The circumstance that Caroline told us lately of the children on the desert island in the Mississippi, naturally led to some conversation about that prodigious river and the countries through which it flows.

We looked at its course to-day, in my uncle's large maps of North America. He showed us an account of it in Morse's Geography, and he made us observe, that, taking in all its windings, it is upwards of a thousand leagues in length; that it passes over twenty degrees of latitude; and, after joining with the Missouri, and receiving a multitude of smaller streams, though many of them are navigable for hundreds of miles, it pours its united waters into the Gulf of Mexico.

It is evident, he says, that the country through which it runs, was formerly inhabited by a more intelligent race than the natives now appear to be; for large mounds of earth are frequently met with near the banks of the river, within which are found the remains of pottery and other articles, of a superior kind to those now in use amongst the Indians, who are in a very low state of civilization, and but thinly spread over that immense valley.

The Mississippi rises, as he showed us, in a region of lakes and swamps, which are scattered over a table land extending from that great ridge called the Rocky Mountains, nearly to Lake Superior, between the 48th and 49th parallel of latitude. In the first division of its course, it passes slowly and smoothly through *savannahs*, or low plains; covered with wild rice, rushes, and other aquatic plants, the rank growth of which is so great, that travellers say, that as they sat in their canoes, the adjoining forests were completely hid from their view by the lofty fields of waving grass.

In the second division begins the granite country, with forests of elm, oak, and other lofty trees. Then come the dry *prairies*, which are the great resort of the buffalo and deer; and in which sycamore and black walnut begin to appear.

In the third division, which extends above 800 miles, the river increases vastly in breadth; flows through limestone rocks, and receives several tributary rivers, by some of which boats may communicate, with short interruptions, between the gulfs of St. Lawrence and Mexico.

Lastly, begins the extensive tract of land, known by the name of the *Great Swamp*, or as it is sometimes called, the Dismal Swamp. Scarcely a tree or bush is to be seen for 300 miles, except the deciduous cypress, which gives a peculiar and gloomy aspect to this unhealthy region; and, to add to its horrors, it is subject to frequent earthquakes. Lower down, the banks of the river consist of clay, sand, and gravel; almost every flood undermines some parts of them, which fall in, and carry away whole fields and plantations into the stream. From a place called Bat Rouge, which is about 140 miles above New Orleans, the sea, they are scarcely elevated above the level of the river, and would be overflowed during the floods, but for artificial embankments, called *levées*, by which the low

narrow line of plantations is defended. All beyond these embankments is one vast level swampy surface, covered with reeds and rushes, and totally destitute of trees. The inundations are said to have sometimes risen to the height of fifty or sixty feet.

The breaking down of a levée, with the tremendous rush of such a body of water, brings certain destruction on the neighbouring plantations. At those times, the whole surface beyond the sloping banks appears, for thousands of square miles, as one vast ocean; and only four or five years since, upwards of three hundred plantations were overwhelmed with water, and their crops totally destroyed. Very strict regulations have, therefore, been established for the prevention of this misfortune.

In these dreary plains a pretty little species of marmot is found; it is called the 'Prairie-dog,' from a supposed resemblance of its cry to the hurried barking of a dog. The habits of this animal are so social, that they live together in burrows which are called '*Prairie-dog villages*,' and which sometimes spread to the extent of many miles: the entrance of each burrow is through a small mound of earth, of a foot or eighteen inches high, on the summit of which the little animals sit and bark, and flourish their tails; but they plunge in on the least appearance of danger. In winter they become torpid, having first securely closed up the entrance of their burrows, and made a nest of fine dry grass, with a small opening just large enough to admit a finger, and so compact, that it might be rolled along the floor without injury. The burrowing owl is said to inhabit these plains also, dwelling in burrows of the same description as those of the prairie-dog.

24th.—This day, our good friend Mrs. P. left us—I am very sorry to lose her; and so, indeed, is every person in the house.

She had promised, you know, to tell me her history, but circumstances induced her to put it on paper, and I shall lose no time in transcribing it for your amusement, my dear Mamma.

She was anxious to return to her father and mother, as her boys spent this vacation with Mr. Crispin, a very old friend.

To-morrow, as soon as the Lumleys go away, I shall begin to copy her history.

25th.—My indulgent uncle had requested the gardener, or any one who happened to find a dormouse, to bring it to him; and Franklin, in stubbing up an old hollow root of a tree, luckily found one of those little fat creatures fast asleep. It is more plump, but very like a common mouse; the nose is blunter, and its tail is not so pointed; it is of a dun red all over, except the throat, which is white. It lay in a most comfortable little nest of woven grass, which has not been disturbed; and beside it there was a small collection of nuts and acorns.

My aunt has lent me a cage, and we shall see whether the warmth of the house can overcome its habit of sleeping during the rest of the winter; but I shall not for some days put it into a warm room; it shall be treated as if it had been frozen, and revived very gradually.

The same person, my uncle says, who tried the experiment on crickets, which I mentioned to you a fortnight ago, shut up some garden snails in a wafer-box, where he secluded them from food and water; but not from air, for he made several small holes in the box. He also put a few snails into a bottle from which all air was excluded; they, of course, died: but those in the perforated box retired into their shells, the aperture of which they closed with a thin membrane; and there they remained apparently dead, as long as they were kept dry. On being dropped into water of the temperature of 70° , they were found quite alive in four hours, and sticking to the plate which covered the vessel. One large snail was imprisoned for three years, and yet it revived on being put into water.

I was told a most singular instance of the length of time for which life may be suspended in those animals. Some snail-shells had for many years formed part of a little museum; one night the window of the room was left open; heavy rain beat into the case, which had not been shut; and the next day, what had been considered only specimens of shells, were found crawling about the walls.

This faculty, however, is not peculiar to snails; for M^r Socoloff, a Russian, found that some flies and small beetl which had been long immersed in spirit of wine, h returned to life on being thrown into warm wood ash. He was astonished at seeing the flies start up, and, al wiping the dust from their wings, fly away as if nothin had happened.

WEEK 26.

Book of Leviticus—Early Sacrifice—Spring Flowers—Frost returns—Black-headed Titmouse—Farmer's Winter Work—Thrashing Malt—Scoresby on Radiation.

Jan. 29th.—Sunday. My uncle told us this morning, that the book of Leviticus was so called, because it describes the sacrifices and services of the tabernacle, which were to be performed by the tribe of Levi. He then read to us some of the chapters, and he answered in the kindest manner the questions which we all put to him, about the different offerings, and the regulations to be observed by the priests.

As he closed the book, he said, 'The object of these observances has passed away with the Mosaic dispensation, and it is now only necessary to understand their general tendency. Sacrifices and offerings had been established in the infancy of mankind, and though perverted by folly and idolatry, they continued to form a part of every worship in every country. It was the universal belief that sins could only be expiated by corresponding sacrifices of what was most valued; and gratitude for worldly blessings and riches seemed to demand some proportionate offerings.

'Sacrifices, offerings, and ceremonies were a kind of *representative*, or figurative, worship. Compared with the present state of the world, the people of those days had few abstract ideas; even their arts and sciences, and particularly their religious systems, were in a great degree described by allegories, types, and hieroglyphics; and though we can with difficulty see the connexion now, it is probable that every outward rite that was then enjoined to the Israelites, was really typical of some inward principle of virtue, or of some distinct point of faith. Taken altogether, it is certain that their object was to discipline that stubborn people into obedience—to preserve them from the surrounding idolatries—to keep them separate from all other nations, as depositories of the revealed truth—to train them for the reception of a new dispensation—and, above all, they were designed to prefigure the great and final atoning sacrifice of the Messiah.'

30th.—The weather has been so soft and mild for the last week, that it seems as if we had only dreamt of frost and snow. After the thaw, the ground, and even the walks,

were so wet, that we could not go out of doors with any comfort, and as I had a little cold, I stayed in the house for a few days; so I was the more surprised at seeing what a change has taken place. The wheat-fields look greener than ever; the buds of the lilac and sycamore are swelling, and the woodbine leaves are actually bursting open. The flower-buds on the mezeoreon, which Mary showed me last September, are now opening; and a few scattered flowers, which are quite blown out, show us their pretty pink faces, and promise a delightful smell. But more than all, the snowdrops have already appeared, and in the sheltered spots there are many bunches of them quite opened. It is the most innocent, modest-looking little flower; and with its pure and delicate white, forms a charming contrast to the dirty appearance of the walks.

The snow-drop blooms
Ere winter's storms are past,
As she shrinks below
Her mantle of snow,
And trembling shuns the blast.

Feb. 1st.—Dreary as this season is, I find it better than I had expected; but, indeed, there is so much pursuit and rational occupation in this house, that it is impossible to feel any day gloomy.

We have now a return of frost, and besides those birds which venture into the house, there are several others which crowd round it in flocks to seek for food. Sparrows, chaffinches, and yellow-hammers are to be seen every day at the barn-doors, pecking what they can find; and Mary has shown me the larks, sheltering them in the stubble; and the thrushes, blackbirds, and even fieldfares, nestling together under the hedges, as if endeavouring to console each other.

While the ground was covered with snow, I saw the blackheaded titmouse come every day to a thatched shed in the yard, and with its back downwards, draw out the straws lengthways from the eaves of the shed, in order to seize flies concealed between them; and I assure you, such numbers came to one spot, that they quite spoiled the appearance of the thatch. Mary says they are very useful searching for the *larvæ* of the *tortrix*, those ingenious caterpillars, that disfigure the leaves of fruit-trees, by winding them up for their houses. Gardeners, she says,

very ungrateful to these birds; for supposing that they attack the blossoms, they are destroyed without mercy. They are, however, eaters of bees, so that they must be considered somewhat mischievous.

They are easily tamed and taught little tricks, such as drawing up a bucket. Mary placed some almonds yesterday on a sheltered bank; in a short time one of these little black-heads came, and grasping the largest of them in his claw, broke the shell by repeatedly striking it with his sharp bill, and then dexterously drew out the kernel.

My uncle walked with us to-day to Farmer Moreland's, that we might see what out-of-door work was going on in this frosty weather. Besides drawing manure into the fields, while the ground is hard, we found his men busy in mending the hedges and fences; and now that the roads are pretty smooth, he will employ his team in carrying hay and corn to market. Afterwards, if the frost should continue, he says, he will draw coals, which will be no great trouble—there are so many coalpits in the forest. We heard the cheerful sound of the *flails* as we passed his barn;—he was threshing out all his barley to sell for making malt. As we walked home my uncle told me the process of malting.

'Beer is, you know,' said he, 'a fermented liquor, made generally from barley after it has been converted into malt; as in its natural state it would produce but an imperfect fermentation.

'The grain is first steeped for two or three days in water, that it may soak and swell to a certain degree. The water being then drained off, it is laid on the floor in a heap of about two feet high, when, with the warmth of the house and the imbibed moisture, it begins to *germinate*, and to shoot out its radicle; which is checked by spreading it out thinner, and frequently turning it over with wooden shovels to cool it. These operations require several days, and it is then thrown into the malt-kiln and slightly baked. The time it is kept there, and the heat to which the kiln is raised, depend on the kind of beer to be brewed, and the required colour for the malt; it is, however, enough for you to know, that from eight to twelve hours is sufficient; and that from 130° to 160° of the thermometer gives all the varieties of colour from pale ale to the brownest porter. By this process the grain undergoes a material change; it

acquires a saccharine or sweet quality which it did not possess before, and which is destroyed if either the germination or the kiln-drying be carried too far. It also loses a great proportion of the mucilage that it contained; which is the reason why the flour of wheat that has been reaped in wet weather is generally bad; the grain partially heats in the stacks, a tendency to germinate takes place, and there is, therefore, a deficiency of that nutritious part, the mucilage. In this case the flour is said to be *malty*.

'This accounts for the bad paste which your aunt had some days ago; it was made of malty flour, and you know it had not the adhesive quality of good paste.'

3rd.—How pleasant it is to find some chance circumstance relative to any subject, about which we have been interested. Here is something that I found in Scoreaby's Journal; and it seems quite to agree with my uncle's opinion.

'This night stars were seen for the first time during fifteen weeks, the sky being beautifully clear. The sea, as usual on such occasions, began to freeze as soon as the sun descended within four or five degrees of the horizon, though the temperature of the air was considerably above the freezing point. Whether the heat of the water be radiated into the atmosphere, according to the theory of Dr. Wells, or whether a cold influence of the atmosphere be conveyed to the water, may be a doubtful question; but the fact, that the water more rapidly loses its heat when exposed to the full aspect of a cloudless sky, is certain. In cloudy weather no freezing of the sea ever occurs, I believe, till the temperature of the air is below 29° ; but in the instance now alluded to, the freezing commenced when the temperature was 36° , being about 8° above the freezing point of sea water.'

WEEK 27.

Jewish Sacrifice—Sin-offering—Naturalization of Plants—Buds on Peach Trees—Rice in Upper Canada—Civilization and Ornament—Arts—Mrs. P.'s Narrative.

Feb. 5th.—Sunday. My uncle said to-day that before he quitted the subject of the Jewish sacrifices, he had few more observations to make, to which he requested attention.

‘In a worldly point of view,’ he said, ‘the punctual performance of all those rites, and a strict obedience to the ceremonial law, were the terms on which the Israelites were to inherit the land of Canaan; and in a spiritual sense they were to be considered as the means of sharing the benefit of that great sacrifice of Christ, which was to lead to the inheritance of the heavenly Canaan. The institution of animal sacrifice had continued until the giving of the law, no offering but that of an animal being mentioned in Scripture up to this period, except that of Cain, which was rejected. But when the law was ordained, we find that the connexion between animal sacrifice and atonement was clearly and distinctly announced; and that certain prescribed offerings were to be accepted as the means of deliverance from the penal consequences of sin.

‘He who presented a sin-offering was commanded to lay his hands upon the head of the animal, as a confession of his own guilt, and as an acknowledgment that the punishment he deserved was, by the gracious forbearance of God, transferred to the victim. On these terms the offering was accepted, and a conditional pardon granted. The Hebrew word for sin-offering includes the sense of cleansing, expiating, and making satisfaction; and therefore every sin-offering, 1st, implied contrition and repentance; 2ndly, an humble hope of averting a just chastisement by this figurative retribution;—and 3rdly, a firm belief in the efficacy of the great final atonement. The Jews well knew,’ added my uncle, ‘that none of these sacrifices had in themselves sufficient value to clear the criminal, or to procure his pardon; they knew that they were only instituted as a public avowal of his crime, and as a type of the perfect expiation to be afterwards made by Christ for the sins of mankind.

‘It was indeed the object of all the sacrifices of the Mosaic ritual, to impress the people with the necessity of expiation, even for involuntary offences; and to fix in their minds that awful maxim, as St. Paul expresses it, that “without shedding of blood there is no remission.” This lesson was inculcated in the earliest sacrifice upon record—when respect was had to Abel’s sacrifice of the firstlings of his flock, rather than to the husbandman’s offering of the fruit of his ground; and afterwards in the covenant with Noah, as well as in various parts of the Mosaic law, where blood was in the most absolute way prohibited to be eaten,

as being a holy thing consecrated to the purpose of general expiation. This expiatory, however, the apostles emphatically say, belonged not to the blood of bulls and of goats, but to the blood of Christ, of which the other was only a temporary emblem.'

My uncle then read to us the several parts of Scripture to which he had alluded; and he added, that though we are now ignorant of the particular object of the ceremonies and minute directions for the sacrifices and offerings, we may perceive that solemnity and reverence were strongly enforced in all, with an exactness of obedience to lesser regulations; which shows that neither must we neglect the smaller duties while we obey the 'weightier matters of the law.'

6th.—A number of curious circumstances were mentioned at breakfast, in a conversation on the force of habit, not only in animals, but in vegetables; and my uncle thinks it is a subject on which further inquiry would not be more interesting to the philosopher, than useful to the farmer and gardener. I have only time to write a very little of what he said.

He told us that there are several plants, which have been naturalised in cold climates by bringing them there step by step. Rice he gave as one instance; it is a native of the East Indies, within the torrid zone, but was early cultivated in South Carolina, the Canaries, and the northern parts of Africa; and about a hundred years ago it was sown in Italy. It has ever since been creeping towards the north of Europe, and there are now very large plantations of rice on the banks of the Weser. It is, however, necessary in Germany to use the seed which has been ripened there; that of Carolina will not thrive at all, and Italian seed but indifferently, being destitute of that power of withstanding cold, which the German rice has acquired by habit.

Another example of the gradual effect of habit on plants my uncle learned from the late Dr. Walker. The Brazilian passion-tree is, you know, an evergreen in its native country; but when the doctor was a boy, in 1773, some plants of it near Edinburgh annually lost their leaves. During his life, however, they became gradually inured to the climate; and he says that in his latter years, in sheltered situations, they have retained their foliage through the whole winter.

I asked my uncle whether those plants, which ha

come from a warmer region, and are naturalised here, flower later in this climate than in their own.

'The times of the appearance of vegetables in the spring, seem,' said he, 'to be influenced by early acquired habits, as well as by sensibility to heat. That same Dr. Walker, whom I mentioned a few minutes ago, had some very singular ideas on this subject: his opinion was, that plants removed from one climate to another, generally observe their original season of flowering, unless prevented by some powerful cause. The climate of Spain and Portugal, in December and January, suits the flowering of the laurestinus; and you have seen that the cold of Gloucestershire, in those months, was not sufficient to deter it from following its old habits. In the northern parts of Scotland, however, it does not flower till April. Dr. Walker thought the flowering of any shrub in winter, in this climate, was an indubitable proof of its not being a native: and he therefore supposes the arbutus to have been a native of Iceland; in the fact, I believe, he is right; but when the similarity of the climates is considered, it is rather a whimsical proof of his doctrine.

'He gives, however, several instances of plants brought from the southern hemisphere, which flower there at the time that the sun is in the tropic of Capricorn, and which adhere in this country to their old December rule, without obeying the influence of the sun when in Cancer.'

I afterwards met my uncle in the garden, where he showed me an immense quantity of buds on the peach-trees, and took great pains in teaching me the difference between the flower-buds and leaf-buds—the former, short, thick, broad, and full, with a downy covering;—the leaf-buds, much less downy, longer, and not so thick. In a few weeks, he says, I am to see these trees in full flower, notwithstanding this wintry weather.

7th.—From all I had heard Colonel Travers say about rice, I imagined that its cultivation was almost confined to India; and I had no idea, till yesterday, that it grew in North America, and even in Germany. I renewed, therefore, the conversation to-day; and I now find that it is so much cultivated in Spain, particularly in the low parts of the province of Valencia, that a very large quantity is exported every year.

The ground is prepared for it there by first sowing beans;

and when they come into blossom, which is about March, they are ploughed in for manure, and flooded with water to the depth of four inches. After a third ploughing, the rice is sown; and when it comes up, it is transplanted to another prepared field, and again covered with water. Each stem produces about twenty-four fold. When ripe it is gathered in sheaves, and put into a mill, the lower grinding-stone of which is covered with cork, by which means the chaff is separated without bruising the grain.

My aunt tells me that rice grows wild in the swamps of Upper Canada; and that the shallow parts of Rice Lake, which is near the residence of Mrs. * * *, is full of it. Her letters describe it as having the appearance of reeds with long narrow leaves, and bearing clusters of flowers at the top of the stem.

It is curious that the plant chiefly cultivated in the Sandwich Islands for food is managed very like rice;—the *taro*, to grow in perfection, requiring irrigation. The fields are divided for that purpose, like the rice grounds of the East, into small squares which may be easily flooded, and the roots are planted in rows. The root of the taro when roasted resembles the yam; but it is usually pounded into a paste, and then mixed with water, so as to become of the consistence of porridge.

The Sandwich Islands are nearer to you than to England, and yet perhaps you do not know, dear Mamma, that although the bread-fruit is the most important of all their vegetables, they have another very useful one, called *Tee* by the natives. The root is sweet, and produces a pleasant liquor, but a little intoxicating. The leaves woven together form a light cloak for the inhabitants of the mountains;—something like those formed of the palm-leaves by the poorer natives of Hindostan, to shelter them while at work in the open fields. Fences are often formed by planting the tee roots close together; but what makes the plant particularly remarkable is, that a stalk of it is with them the symbol of peace, as a branch of olive is with us.

Of the bark of the paper mulberry that ingenious people manufacture very nice cloth; they make beautiful r from the leaves of their palm trees; and you know w pretty cloaks and caps of feathers have been brought h from all those islands. They even stamp their cloth v patterns; and their weapons and bowls are highly car

'This shows,' my aunt says, 'that whenever people arrive at a certain point of civilization, that is, as soon as their food and other necessities of life are surely and regularly supplied, the ornamental arts as surely follow.'

She afterwards added, that she thought it would be a very nice winter amusement for us to describe to each other the arts and luxuries as well as the principal natural productions of the different parts of the globe.

My uncle approved of this idea, and we are to try it sometimes as we sit after dinner round the fire. I fear I am quite too ignorant to attempt to bear a part; but I am sure I shall be delighted to listen.

8th.—The sun rose this morning so brilliantly, and the distant hills looked so remarkably blue and clear, that I was sure we should have a fine day and a long walk; but my uncle told me that, at this season, both of those appearances indicate rain; and he took me to the barometer, and showed me, by his meteorological journal, that the mercury had been *gradually* falling ever since Monday night, and that it was very hollow on its upper surface. From all this he thinks there will be some days of continued bad weather. Accordingly, before breakfast was well over, the clouds began to collect about the mountain tops, and it is now raining. I have already made some progress in transcribing Mrs. P.'s memoir for my dear Mamma; and if my uncle's prediction be correct, I shall have time to finish it before the return of dry weather.

Mrs. P.'s NARRATIVE.

I am now going to fulfil my promise, Bertha, by giving you a sketch of my life; and as I shall begin by a detail of those early circumstances which have unceasingly influenced its happiness or misery, there will seldom be occasion to interrupt my narrative in order to point out their consequences. You will have no difficulty in perceiving how inevitably my errors led to their punishment; how certainly the heart is corrupted by selfish indulgence; and how pursuits, that in themselves are laudable, may become pernicious, if not controlled by a sense of duty.

I was unfortunately what is called a very promising child, quick in all my perceptions, and equally capable of retaining the knowledge I so readily acquired. My parents, delighted at my progress, were proud of their child and by

friends and visitors I was considered a prodigy. This injudicious praise had so powerful an effect, that, when I was about twelve years old, I determined to lay aside the common amusements of children, and to become a singular and distinguished character. My ambition was the more easily fostered, as in our retired situation we had but few neighbours; and, therefore, an occasional interview with their children, or a chance visit from my cousins, supplied me but scantily with opportunities of giving way to the natural activity of youth, or of having my pedantry successfully ridiculed by companions of my own age.

The pleasure which I had formerly taken in learning whatever was difficult, in order to astonish my mother, now became a real wish for knowledge; and as my ardour increased every year, I studied many subjects which are not in the usual course of female education. Though my mother would by no means have approved of such pursuits for other young ladies, yet so great was my influence, that I was not only uncontrolled by her, but even assisted by my father, as far as his own powers permitted.

The attainments of either were very limited: they had amiable but narrow views of life; they were devoted to each other, and to their children; and to the poor around them they were actively useful and benevolent. But their income was moderate, and my mother was obliged to practise the most indefatigable economy in order to ensure to her family those comforts which she thought they were entitled to enjoy, as well as to enable her to assist those whom she considered as dependent on her bounty; and, at the same time, to save something every year as a provision for their children. About all this I then knew or cared but little; I was insensible to the merit of her steady perseverance in these duties, and thought very lightly of the talents necessary for such management; or I thought of them only to regret that intellectual creatures could waste so much of their existence upon such vulgar labours.

I have, in latter years, often wondered how my mother's plain good sense could be so blinded by partiality, that I never even tried to conquer my absurd fancies, and, forcing me into obedience, to teach me to be useful; deed, it is most painful to me now to think of her generous but ill-judged forbearance.

While she was engaged in superintending her serv-

or instructing my young brothers, or occupied in needle-work for us all, during whole days, with scarcely the interruption of a walk, or the indulgence of a book, I was poring over my high-flown studies; perhaps reading Horace with one brother, or conquering mathematical difficulties with the other; or, seated under an old ilex tree on the lawn, writing verses. Sometimes, to gratify my mother, I condescended to practise on the piano-forte; but this was one of the secondary employments which I despised; a thing for show; a silly waste of time; nothing that could benefit mankind by the development of the human understanding.

When I was eighteen, my philosophical enthusiasm became so great, that every moment seemed lost which was not devoted to scientific pursuits. To waste that time and those powers which were given me for the noblest purposes, in the common nothings of life; to sit with my friends, listening to the trifling gossip of the country, or to homespun discussions, were sacrifices to which I would seldom submit, and I always broke away from them with undissembled scorn.

Many a lonely hour that she has passed repairing the clothes of which I disdained to take care, I might have cheered her by my company; or enlivened my father's evenings by a little simple music, in which he delighted. But conceit and selfishness always accompany each other; and, what is more to the point, always lay the foundation of their own punishment; the very talents and pursuits which, under proper control, ornament and raise the female character, became, by their abuse, my incessant bane. I had the pride of human intellect; and prayed for knowledge: alas! I never prayed for wisdom, nor for humility.

I will give you an instance of my odious selfishness, because it shows how short the space is between right and wrong! I went one evening to the drawing-room in search of my brother, but he was not there. My father had a book open near him, though he was not reading; my mother was working, and both looking sad and anxious; I was quickly retiring out of the room, when my father, stretching out his hand, and drawing me gently towards him, said, 'Gertrude, my love, stay with us. We have had some unpleasant news to-day. Your poor mother and I are too low-spirited to amuse each other; and we want you, my dear child, to cheer us a little.'

'Yes, papa,' said I, 'I will come as soon as I can,' and I hurried away.—I shall never forget his look of disappointment.—Can you believe it?—I was so callous to every good feeling, that I coolly sat down to finish some mathematical question in which I had been engaged, before I condescended to return!—But you will ask—had I no principles, no sense of duty or religion to guide me?—Yes, I had principles, but they were always warped by some silly enthusiasm: I had religion, but it was that sort of highly-wrought sentiment which produces no good fruits; it was very spiritual, I thought, but it had little influence on my actions.

My mother was anxious to bring me more into the world; and I complained myself sometimes of the want of amusement; but I professed to despise company of all kinds: dancing was an absurd waste of life, and the stiff country dinners were tiresome. Had my vanity, indeed, been more gratified at the balls and parties to which I was taken, I should, probably, have liked them amazingly; but the truth was, the ladies thought me learned, and were afraid of me, and neither my appearance nor my conversation pleased the other sex; I therefore discovered that such occupations offered but little enjoyment to a cultivated mind.

When I arrived at the age of twenty-four, I was a strange compound of selfishness and sentiment, of folly and learning. Of every species of useful knowledge I was ignorant;—to make or mend my clothes I considered degrading; and all the details of domestic economy I treated with contempt. My mother reasoned with me, but in vain; my father interfered, but it was too late: my habits were formed. My parents could not always conceal their feelings of disappointment, and I withdrew more than ever to my own ideal world of poetry and science, and to studies which, I cannot too often repeat, are praiseworthy only when kept in due subordination. My father once said to me, with tears in his eyes, 'The time will come, Gertrude, when you will feel your mistake;' and it did indeed come.

Mr. P., a college friend of my brother's, came to v him about this time, and spent a week at our house. was as enthusiastic as myself, ardent in science, and perfect in classical literature; he was, in a word, the n amiable and accomplished person I had ever kno Pleased with my conversation, he paid us repeated vis

and, without sufficiently studying my character, he sought to win my hand. It was the most foolish thing that Mr. P. ever did!

The attentions of such a man were irresistible; he really gained my heart, and I soon consented; anticipating with delight, as I told my mother, a life devoted to him and to science. My father, however, entirely disapproved of the match, as Mr. P. had a very small fortune, and as it was too obvious that I was unfit to be a poor man's wife. I exerted all my former influence to coax him into acquiescence; but the most I could obtain was, that instead of an absolute refusal, he insisted on our waiting for a year, that we might each have time to understand the duties and difficulties of a married life.

I had been accustomed, not merely to indulgence, but almost to deference. Gertrude's opinion had always been consulted; her advice had always prevailed; and was she now, and in a matter of such importance, to be controlled like a child? 'No, sir,' said I, 'Mr. P. is *my* choice, and I will not risk my happiness by submitting to any delay.'

My father persisted, though there was a painful struggle in his affectionate mind; and my mother tried the effect of persuasion with me, but my passionate temper would brook no restraint. At length one of my brothers became alarmed, and thought it right to intercede; he mildly opened their eyes to the conviction, that my determined character was their own work, and that it was now too late to retrace their steps. He pointed out to them the dislike I had excited in the neighbourhood by my contemptuous and satirical conduct to everybody; and the ill effect that the reaction of that feeling might have in still further hardening my disposition; and he endeavoured to convince them that a husband's influence was the only chance left of withdrawing me from the follies they lamented. He then urged the family, the education, and the manners of Mr. P., who had everything but wealth to recommend him; and earnestly implored my father to relent.

He succeeded. Mr. P. was accepted, and settlements were now to be discussed; but scorning all inquiry into the income of one whom I loved only for his merit, I indignantly exclaimed,—

Can gold calm passion, or make reason shine?
Can we dig peace or wisdom from the mine?

We were married, and went home to a sweet little place which Mr. P. had on the banks of Ullswater. The estate was small, but had been in his family for ages; the house was a two-story building of olden times with projecting windows; it was situated in a valley which was sheltered from every cold blast; and altogether looked as if it must be a happy home.

'You are mistress of this humble place, Gertrude,' said Mr. P.; 'and over my purse you have unbounded power. Your wishes are moderate, and you well know that our expenses must be limited by discretion. This property has been sufficient for my father and my ancestors; I hope you will assist me in preserving it free from debt and incumbrance for my successors. Of few things I have a greater horror than the disgrace of debt. Remember then, dearest Gertrude, that in our present situation economy becomes an essential duty.'

I considered this speech as so very devoid of sentiment, that I did not deign to reply.

In a few weeks, my mother came to visit us; in her own kind manner, she assisted me in my domestic arrangements, with as much anxiety, I thought, as if matter of life or death; and having established me with good servants, and put into my head more ideas than I had ever admitted before on the subject, she left me in a very happy state.

The summer did pass happily. Mr. P. had such a variety of tastes, and so kindly adapted them to mine; we enjoyed so much our studies at home; our mineralogical and botanical rambles; and our sketching and boating parties, that our life glided away in real felicity. As autumn and winter advanced, we spent less time out of doors, and more was given to our visitors, who remarked that now there might be some chance of seeing us comfortably. But the house was never comfortable to visitors. My dinners were ill-arranged, and everything was irregular. An old gentleman, who had been intimate with Mr. P.'s father, and who continued the warm friend and counsellor of the son, used frequently to ride over on a frosty day to dine or sleep; or sometimes called upon us for luncheon after he had been shooting. But he always came at some unfortunate time; when our dinner was shabby, or ordered at some late hour: or perhaps there was no fire to warm him at a cold ride; the unswept hearth strewn with cinders; t

room all littered, no one to receive him, and when I did appear, probably my dress untidy, and a frown on my brow. He had long had the habit of speaking his mind, and very mortifying things he sometimes said, which made me hate him

'Why, madam,' (a beginning which, from him, always showed displeasure,) 'you seem to have a fresh cargo of new books every time I come here. Let me see—Chemistry, Botany, Geology, Italian Tales, and Scotch Novels. All admirable food for the mind, to be sure; but we old-fashioned folk are vulgar enough to like a little comfortable food for the body also. Economy turned upside down!'

I had determined to make our little place a paradise. The garden, which was to be brilliant at all seasons, was, therefore, crammed with flowers, and the most beautiful shrubs were to ornament my new walks; a simple pleasure, thought I, to which no one can object. Every week matted parcels of treasures arrived by the coach, from distant nurseries; and as Mr. P. acquiesced in all my suggestions, we planted and worked together. In thus beautifying our place, we never imagined that we could incur any great expense; besides, when the thing to be done was good, I thought it a proof of a narrow mind to consider the cost. For the same reason, I paid no attention to the weekly accounts of my housekeeper. She understands managing much better than I do, and all those little particulars, of a few pence perhaps, are really beneath my notice.

At last we were blessed by the birth of a boy, and I thought my felicity complete.

Alas! whene'er we talk of bliss,
How prone we are to judge amiss!

I had sent to London for all my baby clothes, it seemed such a waste of time to work at them myself. They were beautiful, so was my boy; and so proud was I of him, that I was profuse in my generosity to all his attendants. I determined to nurse him, and to attend him night and day; and so completely was I engrossed by this new occupation, that I quite neglected Mr. P., whose inseparable companion I had been till then.

When I was so much away from him, he had more leisure to perceive the irregularity of the house. And when he went out and mixed with others, he could not help feel-

ing the want of comfort at home Still he could not bear to think that I was in the wrong.

In two years came another fine little boy, and with him fresh expenses. I just then began to feel that money was not always to be had; long accounts for dress, and fanciful furniture, for new books and scientific journals, for plants, shells, and mineralogical specimens, and a variety of other things equally necessary, came crowding in; and when I asked for money there was none at command. My husband thought that I had paid for all these articles when I received them; and our ordinary expenses had already absorbed our income. With a blind confidence that almost amounted to weakness, he had trusted to my prudence, and made no inquiries into the household management; perhaps, he too had been a little inconsiderate in his farm and plantations; but far be it from me to shade my own errors by throwing blame on him.

I begged of the people whose bills I could not pay, to wait a little; and to keep them quiet I added debt to debt. But, at last, the crisis came, and these doubled and trebled debts, amounting to an enormous sum, appeared in dreadful array before Mr. P.

Then came demands from the country trades-people who supplied our house; brewer, butcher, baker, &c.; and then, too, we discovered that the housekeeper, taking advantage of my foolish confidence, had never paid them; she had deceived me by false receipts, and in every possible way betrayed her trust.

This shock awakened me; I understood the extent of my follies, and, too late, saw their consequences: I saw Mr. P. sink under the blow, and oh! Bertha, I did then, indeed, feel remorse. But, although wounded in the most sensitive of his feelings, and involved by me in what he had of all things most dreaded, he said he only reproached himself. His kindness never failed; but I saw that I had lost his respect, and that he could no longer rest his happiness on me. I became fretful and truly miserable, and a sort of reserve and mutual coldness gradually took place of that 'bound' sympathy of soul' which we had till then enjoyed.

To be in debt, Mr. P. considered a state of actual disgrace, and he would have gladly sold his patrimony to emancipate himself from the load; but it was entail. There were two other ways, either to raise money on m

gage, or, if his creditors would give him time, to devote the chief part of his income to a fund for the purpose of liquidating their full claims; and in the mean time, to live on bread and water, if necessary. He turned over in his mind also a hundred different schemes for employing his time and talents, so as to augment our means; for I could see that, though he dreaded the privations which I must endure, yet that one of his greatest difficulties was, the doubt whether I could conform to the rigorous parsimony that we were now called on to practise. Anxious for advice, he rode off to consult his old friend and counsellor, Mr. Crispin, whom we had not seen for a long time; and I was rather surprised by his return the same evening, as he generally slept at the hall, when he went there. He looked agitated, and though he treated me with more tenderness than usual, since our misfortune had burst upon him, yet he refused to tell me the result of his consultation.

In the evening, however, after a long silence, he suddenly turned round to the table where I was actually endeavouring to discipline my fingers to the use of a needle, and said, 'Gertrude, will you be contented to remain here in acknowledged embarrassment, shut up from the world, and endeavouring with me to save and to pay; or, will you for a time return to your father and mother? You know they will receive you with open arms; and you can there have the comforts so necessary to you and our poor little children. I really think it will be the wisest course to ask an asylum from them; for how can you adapt yourself to our present circumstances?'

'If you do not actually drive me from you, my dear Edward,' I replied, 'if you will suffer me to remain with you, poignantly as I feel the reproach implied in your proposal, it will be my only consolation to share your difficulties, and to expiate my foibles by a devoted economy.'

'I felt—I knew that would be your decision,' said he, as a tear stole down his cheek. After a few days had passed, Mr. P.'s old friend came to see us; not by any means an agreeable surprise to me, for I dreaded his contempt and rebukes, and I was still but a wayward and only half-humbled creature.

'Well!' said he, entering the room, 'I believe I was unreasonable in the plan I proposed; so I am come to try

if we can do better. But what did you think of it, madam?"

I told him that it had not been confided to me.

'How so—did not Edward tell it you? How was that, Mr. P.?"

'I did not like to give my wife the pain of knowing that you could have thought so unkindly of her; and as I had no hesitation in regard to my decision, it was not necessary to suggest to her such a cruel idea.'

'It was very generous forbearance on your part, said he, 'for you left me full of indignation. I will tell you myself, Mrs. P. I have lately inherited an estate in Jamaica; I am unable to take possession of it in person, and I proposed that Edward should go as my representative, and manage it for me, as long as his affairs are recovering here. But I made it a positive condition, that he should give you over to your parents' care, and quietly disencumber himself of a useless, extravagant wife. That, madam, was my scheme. You are shocked, and turn pale; but you must allow that it was very natural advice. However, I begin to think it not quite right to propose such separations, nor is it just to refuse you some trial of amendment. I have come now, therefore, to renew my proposal, without that condition, and to offer a salary double that which I first named. I will undertake the management of your property here; and for this house, I will allow you a fair rent. And now, madam, consider this well, and don't let yourself be angry at me, for I am an old man who deals in plain truth and plain sense.'

Wounded as I had often been, by the harsh things this old man had said to me, yet his blunt generosity now overcame every feeling but that of gratitude; and before he left us the next day, everything was arranged with him for our immediate departure. The demesne and all our real improvements were to be kept up; the whole income was to be applied to the payment of the debt, which he undertook to discharge by regular instalments; and our books and some other extravagant purchases, on which I had lavished so much money, were to be sold if he found it necessary.

In parting from us, he took my hand, for the first time since we had been acquainted, and said, 'I do now believe that you are attached to your husband—I am glad you are going with him; and I trust the experience you have a

dearly bought will be of lasting use to you both. I have one word more, and I have kept it for the last, to make the deeper impression. Remember these rules, fix them in your mind, and repeat them daily.

‘Buy nothing that you do not absolutely want; and never go in debt for any thing you do want, be it ever so necessary.

‘Waste nothing.

‘Let ORDER preside in every part of your house.

‘Remember, that a drawing-room, though elegantly furnished, is disgusting if untidy.

‘It is no excuse for bad dinners and comfortless rooms, that the mistress is engaged in her laboratory mixing gases, and trying experiments that are known to every apothecary’s apprentice. Women, indeed, may store their minds with knowledge, but then their homely duties must not be neglected.

‘Let me hear, that when your husband returns home, after a busy morning, he finds a cheerful house and a smiling wife; or, as sweet Allan Ramsay would say, “a blazing ingle, and a clean hearth stone.”’

With heartfelt sorrow I quitted the place where I had spent the happy beginning of my married life. It seemed as if I was leaving every thing that was dear, and that I never could again enjoy the tranquil life Edward and I had led for six years. Next came the parting with my children and my parents! But I will not touch on the painful struggle between different duties; nor will I mention the distress of mind which my dear father and mother suffered in consequence of my imprudence. I consigned my dear boys, rosy, smiling, little, lively creatures, to my good mother, and she has truly done them justice.

Our passage to Jamaica was most favourable. Mr. P. took possession of the San Pedro plantation, in the name of Mr. Crispin, and we were immediately settled in the dwelling-house attached to it. It consisted of one story only, as most of the houses in that country are so built, to preserve them from hurricanes and earthquakes. A veranda extended along the west and south sides, ornamented with oleanders, African roses, grenadillas, passion-flowers, and other lovely plants, trained to the pillars. To the north-west lay a flower-garden, inclosed by a hedge of the Barbadoes flower-fence. At ten or twelve feet from the ground,

the stem of this beautiful and extraordinary plant divides into several spreading branches, armed at each joint with strong crooked spines; and every branch terminates in a loose spike of flowers, which are something like carnations, and which combine the most glowing mixture of red, orange, and green, accompanied by a strong but agreeable smell. I shall mention only one more feature of this charming spot: the garden was sheltered by a large *Pimenta* grove; and, as you are acquainted with this beautiful species of myrtle, which produces the allspice, you may imagine how delightful I must have found its fragrance and its shade in that sultry climate.

The violent resolutions I had made to abjure my former errors, and to devote myself to my household duties, now led me into the opposite extreme. I entered into every little detail with such indefatigable earnestness, and, ignorant of the manners and customs of the West Indies, I made such an infinite number of teasing regulations, that I completely worried my servants and slaves; and even Mr. P., I do believe, thought this extreme the worst. I became so fussy and so busy, that I thought I had time for nothing else, like the Norwegian ladies, whose lives are absorbed in domestic drudgery.

One circumstance, however, greatly annoyed my feelings—the being surrounded by slaves. Though they did not, in general, look unhappy, and though they enjoyed many comforts, yet the whole system excited my indignation. You know I had never learned to control or conceal my sentiments, and I now took every opportunity of expressing them with such silly enthusiasm, and so publicly, that I not only offended all the whites, but injured the poor negroes themselves. My imprudent sympathy not only made them feel their degraded situation the more acutely, but materially helped to inflame that spirit of discontent which, more or less, must always accompany slavery, and I really tremble in reflecting how much I may have been accessory to the events which afterwards happened. Yet you will be astonished, Bertha, when I add, that such was the perverse inconsistency of my character, that while overflowing with compassion for these poor creatures, I was a most arbitrary mistress to those who were among our domestics, and tyrannical over all who were under my influence. I had established an evening-school for the slaves, when their wo

was done ; I did really pay it unremitting attention, and fancied that I found great pleasure in being useful ; but I could not bear to have my benevolent intentions thwarted ; those who were negligent in their attendance excited a stronger feeling than displeasure ; and I blush in confessing that the task-master found it was his interest to treat those who had displeased me with increased severity.

One of the females who worked in the plantation had a very engaging daughter ; she had a good figure, spoke English tolerably, and had a quickness and intelligence which particularly pleased me. I had a great wish to have this girl about my person, and at last obtained her, though against her mother's will. She lived in the house, and was a most useful and good-natured creature ; and the rapidity with which she acquired all the knowledge that I could teach, fully justified the high opinion of her that I had formed.

Sometimes, in the intervals of my economical fever I amused myself in making little collections in natural history ; and she endeared herself extremely to me by the zeal with which she entered into all my pursuits. Birds, insects, beetles, spiders, reptiles, were all caught by her dexterity ; and the tenderest plants and flowers were laid on my table as fresh as when they were pulled ; so that Mr. P. and I were able to examine, at our leisure, all the natural productions of the island. In short, during more than a year and a half, this blameless and innocent girl, Nanina, continued high in my favour, and was treated more like a daughter than a slave. She really loved me, and her efforts to please me were most assiduous. But I had a temper which had never been controlled in youth, and which was still unmanageable. Caprice alone governed it, and I began to grow tired of poor Nanina. Perhaps she might have been sometimes rather too familiar in her manner, but if so, it was my own fault. Always in extremes, I now became dissatisfied with everything she said or did. If she appeared hurt at this unaccountable change of conduct, I was still more angry ; and one day, that she threw herself at my feet, and with tears in her eyes remonstrated against some unjust accusation, I barbarously spurned her from my chair, and ordered her never more to enter my room. Alas ! how quickly does the spirit of injustice grow ; the next day I missed a favourite ring, and I accused her of stealing it !—

Yes, I suspected poor Nanina, who had been invariably faithful, and whose principles I well knew had been proof against many far greater temptations.

I learned that Nanina had gone to confide her griefs to her mother ; and as she did not return I became so incensed at her for leaving me, as well as at her family for encouraging her to stay away, and I spoke of them with so much bitterness to the overseer, that he lost no opportunity of treating them with rigour. No attention, however, was paid to my positive orders for her return : she was not with her family ; to all inquiries about her, they preserved a stubborn silence ; and it was notorious that the unjust harshness of the overseer to them all was the effect of my resentment. Several weeks elapsed without any tidings of her ; and, irritated by what I considered her obstinacy, I determined to communicate the whole affair to Mr. P., in order that he might enforce obedience to my commands. I did so, and never shall I forget the horror and astonishment he expressed at my conduct. At first I was vexed and mortified by what he said ; but when he calmly retraced to me all the circumstances of the case, contrasting my professed sensibility with my real inhumanity, and dwelling not only on the capricious extremes of my affection and hatred for Nanina, but on the accumulated cruelty of suspecting her without cause, of punishing her without proof, and of revenging my quarrel with her on the whole family, I sunk into his arms, I saw and acknowledged all my odious errors, and would have done anything to compensate the poor girl for my base injustice, if she could have been found.

All this took place in the beginning of summer ; and in the middle of the hottest part of that season, Mr. P. was obliged to go to Spanish Town, which was fifteen miles distant, about business. The day passed heavily, the sultry air oppressed me, there seemed to be an unusual stillness everywhere ; the slaves even appeared to work in sullen silence, and I scarcely heard a sound but the buzz of some insect, or the angry chirp of the humming-birds, as they quarrelled about the flowers at my window. My thought turned mournfully upon my late conduct, and upon the severe but just expostulations of my husband. They did indeed oppress my heart ; and, in some measure to relieve myself, I went in the afternoon to the school, but I found

it locked and no creature near it. There was a mountain-path near the Pimenta grove, where we used sometimes to walk late in the evening to enjoy the land breeze; and taking a book which happened to lie on the sofa, I strolled through the grove and ascended slowly from the valley. The hills in that country are covered with woods which never lose their verdure; and after musing for some time on a magnificent group of the stately cabbage palm, the tall cedar, and the wide-spreading mahogany, I sat down under their shade. At length I opened my book, and the very first thing I saw was my long-lost ring! I quickly recollected that many weeks before, I had put it in there to keep the place open, and I felt so shocked at my unworthy suspicions of Nanina, and so angry at myself, that I was quite overcome. But gradually the breeze revived me, and I burst into tears. At that moment,

When sunk by guilt in sad despair,
Repentance breathes her humble prayer,

I was startled by the sound of hurried footsteps, and Nanina herself appeared before me. She stopped, hesitated—then seized my hand and pressed it to her heart. ‘Oh! joy, joy,’ said she. ‘Nanina thought never more see you, and now me search for you, and no find you in house.’ I was painfully glad to see her—I hastily rose to take her home, and began to express my feelings, but she interrupted me, and said, in the most urgent tone, ‘This day me make escape, and run to tell mistress not to stay in home to-night—they all rise this night, and go everywhere for mischief, but first kill mistress, or make her slave.’

However startled by this alarming speech, I immediately proposed to return home to save my husband’s papers and to tell the servants to escape.

‘No, no, no,—too late,—come with me, me put you safe, but no talky now,—come quick,—come silent.’

As we hurried along through the forest paths, I could not help saying, ‘Nanina, I was unjust to you—I accused you of stealing;—how comes it that you are so kind to one who has used you so cruelly?’

‘That is what me learn from the book you gave me, and taught me to know—me never lose that book;—that book say, ‘Forgive your enemy, do good to him that persecute you.’ Yes, you call me teef, but you be killed dead, if Nanina no

come save you, and Nanina forget all but that you were once good mistress.' She grasped the hand I had laid on hers, as she said this, and I felt her tears drop on it. Oh, what an exquisite moment! I besought her to let me send intelligence to meet Mr. P., but the faithful creature had already sent a trusty friend to warn him of the danger, and to assure him of my safety. She hurried me on—it was dark when we reached the river, and no canoe was to be seen; but we walked along its banks for some distance, when, to my great surprise, it suddenly disappeared. I then recollected hearing that in one spot the San Pedro river dipped under ground; and there Nanina had purposely brought me, that we might cross to the opposite bank, without the assistance of a boat. At last, after many hours' walking, and when I was scarcely able to move, we arrived at one of the reed huts which the negroes inhabit. A man and woman received us;—they said some words to Nanina, which I could not understand, but they looked good-naturedly at me, and laid their hands on their hearts.

Now that we were apparently in safety, and that we could venture to speak at ease, Nanina told me what had happened during the long time she was absent. The day on which, in vexation, she had gone to complain to her mother, she found a stranger in the hut. This was the famous Apakong; he was one of the descendants of the Maroons, who had formerly been so troublesome, and he fully inherited their fierce, discontented spirit. He had instigated the slaves in our neighbourhood to rise against their masters. My injustice to Nanina and her family was an additional pretext, and fearful that her mother might suffer her to return to me, and thus, perhaps, betray their plans, he took her away as a hostage, and till that day had watched her closely; but a general muster of the insurgents had happily given her an opportunity of escaping from his less vigilant wife.

Nanina left me at early dawn, entreating me not to stir from the negroes' hut till she returned. Hours passed in the most intense anxiety, and no tidings came. I knew not what the poor negroes said, but I saw they were deep anxious, listening to every sound, and watching in every direction. They placed food before me, but I could not eat. They brought a branch of a pimenta tree, which overhung the hut, to revive me by its smell; but it reminded me

too strongly of the dwelling at San Pedro, which I had begun to love, and of my dear husband, whom, perhaps, I should never see again. My thoughts flew from that to my former home on Ullawater, and then still farther back, to the home of my youth, and to those dear parents whose over-affection for me had been their only fault. Alas ! thought I, how will they feel, if ———. But this train of bitter reflections was suddenly interrupted by loud yells, which appeared to be rapidly approaching. I was preparing to meet my fate with resignation, when my two poor negro hosts quickly placed me in a corner of the hut, and, covering me over with reed and palm leaves, made a sign of silence. An immense crowd surrounded the hut, and I heard many loud and angry voices inside ; but it was Nanina for whom they asked ; she was the object of their pursuit ; and, full of revengeful eagerness in their inquiries about her, they did not observe the suspicious heap of reeds.

They were not half an hour gone, when poor Nanina arrived, looking quite worn down by fatigue. She had gone to obtain intelligence, and having heard of the insurgents' visit to the hut, and fearing their return, she came to remove me to a place of greater safety. How or when we arrived there I can scarcely recollect ; and what took place afterwards I can still less remember, for I fainted more than once with fright and fatigue. I know that there was fighting close to me—the horrid yells are still in my ears ; and I think I can remember clinging to Nanina when she was seized—a loud shout that was given soon afterwards—and then finding myself again in silence ; and I well remember that Mr. P. himself came into a cave where I was lying, and took me home.

And what a scene presented itself there ! The house partly burnt, the furniture destroyed, the gardens ruined, and every species of devastation committed, for which there had been time or means. My brain, which was already bewildered, now completely gave way. I thought I was the cause, not only of all this destruction, but of the death of Nanina, my preserver, though she was then with me. Nothing could calm me ; and I continued for a long time delirious.

I have since been told, that when Nanina's messenger arrived in Spanish Town, there was such a general conviction that the insurrection of the slaves was a false report,

that much time was lost; and before the military were detached, the rebel negroes had done incalculable mischief to the San Pedro and some neighbouring plantations. At last the troops arrived, and Mr. P. with them; and after a short skirmish, the negroes threw down their arms, and submitted. The ringleaders were taken; and one of them acknowledged to Mr. P. that they had been a long time secretly trying to excite a spirit of rebellion amongst the slaves; that they agreed not to do any mischief to the San Pedro plantations, because Mr. P. had always been lenient and considerate; but that afterwards they felt so much the harshness of *my* conduct, which became so different from what it had been at first, that their vengeance was particularly directed to our house.

My mind continued in such a state for many weeks, that Mr. P. determined to try change of air and scene; and, as soon as the necessary measures had been taken to repair the losses at our plantation, he prepared to take me to Antigua. I was insensible to everything, and can only tell you the circumstances since detailed to me. The voyage began well; but, in a few days, a hurricane arose, which dismasted the vessel, and wrecked us on the coast of Hayti. The crew were saved with difficulty, but everything else was lost, and we were in a lamentable situation, prisoners, absolutely destitute; and even Nanina and our man-servant were separated from us. When I missed her, my former conviction of her death returned with double violence; and I became still more unmanageable. She found it very difficult to convince the people of Hayti that, though a slave, she did not wish for the liberty which they offered; but, at last, after much explanation and entreaty, Mr. P. persuaded the government to let her return to our quarters. When she appeared, I knew her, and tenderly embraced her; I also knew my affectionate husband, who had so long been my only nurse. This momentary return of reason was of short duration; it was followed by a fresh access of fever, and all hope of my recovery seemed now to have vanished.

A favourable crisis, however, came. I awoke to restore consciousness; and the first sounds that I heard were from my husband, at my bedside, uttering his pious gratitude heaven, in a low voice. I scarcely knew the cause of his emotion; but afterwards, when I witnessed his daily ardent thanksgivings, and became sensible of the clo

which had darkened my understanding, I felt my heart more truly and more deeply touched by religion, than it had ever been, even in the period of my highest enthusiasm. I may, indeed, say, that 'The Lord put a new song into my mouth, even a thanksgiving;' and I sincerely prayed that God would enable me to repent of my sins and follies, and that he would turn my whole heart to gratitude and humility.

My trials, however, were not yet over. Every day, indeed, made me more and more conscious of my former errors; and every day I felt more penitent; but I was now to act. Anxiety, want of rest, privations of every kind, and probably infection, soon showed their effects on my faithful companions; and both yielded to the same horrid fever. Experience of their tender care, during my own tedious recovery, had taught me what to do; and duty, love, and gratitude, gave me strength. I who, till lately, had not known what bodily exertion meant, was now actually the only attendant on these poor patients; and I thank God, my humbled spirit was heedless of all trouble!

A French physician, who had been allowed to remain at Hayti during the political changes there, was permitted to visit and prescribe for us. I never can forget his compassionate kindness; and it touched him so much to see me, still very weak, going through every menial work, that he promised to lend me one of his own servants; but government interfered, and, for what reason I could never divine, forbade this act of generosity. I am glad of it; for a strong practical lesson was very useful in completing my reform. My anxious cares, however, were ultimately rewarded by the recovery of Mr. P. and of Nanina; and, as soon as we were able to leave the miserable house where we had been imprisoned, our good physician obtained leave to remove us to a better situation; and he even ventured to supply us with money, for which we were sadly distressed.

After a long and painful detention, the same active benevolence obtained our release; and, as soon as we could hire a vessel, we departed. My kind husband offered to take me to Antigua, and to let me reside there, in the idea that I might have a horrible impression of Jamaica; and he proposed to visit San Pedro himself, from time to time; but I would not consent: the days of folly and selfishness were past—I now knew and felt my duty. We landed in Jamaica, and there a fresh misfortune awaited us. The person who

had been appointed to the care of the San Pedro plantation, during our absence, refused to give it up; he alleged that he had been acting under the direct orders of the proprietor; and more than one reference was made to Mr. Crispin, before all the tedious difficulties could be overcome, and before the law authorities would interfere to dispossess him. To us, who had no ready money, a lawsuit was difficult to manage; and a very long time elapsed before Mr. P. was completely reinstated.

A severe illness, under which Mr. Crispin had been labouring, was a great additional source of anxiety to us, and had materially helped to protract the above affair; but, shortly after its termination, we received a most kind and fatherly letter from him, announcing his perfect recovery; but intimating that he considered his illness as a warning to 'set his house in order;' and inclosing a deed of gift to Mr. P. of the whole Jamaica property. He said he had always intended to bequeath it to him, but that he preferred giving it then, while Edward was on the spot, that he might make whatever arrangements he liked previous to his return to England. And this he hoped might be soon, as he wished, before he died, to see us once more, and to restore to Mr. P. Ullswater estate, which had nearly paid off all his debts. He also sent a considerable sum of money to reimburse our expenses in the lawsuit, and thus effected a sudden change in our circumstances, from poverty to comparative affluence.

It was long since we had had money at command; and the first use Mr. P. made of it was to enable me at once to visit the dear friends from whom I had been so many years separated, without waiting for the final arrangement of his affairs. I need scarcely tell you that, the moment the property was ours, we gave Nanina her freedom. I had intended to have proposed her remaining with me, but I learned that there had been a long attachment between her and a deserving young man; and, before we left Jamaica, I had the pleasure of seeing the faithful girl happily settled.

Just then the Phaëton was ordered to Brazil with despatches, and to proceed from thence to England. Captain M. was nearly related to Mr. P., and offered me a passage which, though much longer, was much more agreeable than if made in any other way. I need not tell you, Bertha, how greatly I enjoyed the time we remained at Rio, and how

happy I was to have you for my companion during the remainder of our voyage.

Thank heaven, I found my dear father and mother well and strong ; my children, too, had just come home from school, for the vacation, and my happiness would have been complete, had my dear Edward been with me. My boys have fine, open, generous minds, and I trust that, in their education, I shall take warning by my own early faults.

From this little history of my past life, you will perceive, my dear Bertha, how much reason I have to be grateful for the afflictions with which Providence thought fit to correct me ; and though your education has fortunately been very different from mine, still, this account of my follies, and their consequences, will point out numerous dangers to avoid, and new motives for continual watchfulness : every page of it will show you the necessity of a vigilant self-control, and will, I think, amply demonstrate the value of homely virtues and of homely knowledge. Do not, however, imagine, that I seek to depreciate the value of scientific or literary pursuits, or that my love for them has diminished, —far from it ;—I would only keep them in their right place ; for I have at last learned that the *useful* and the *intellectual* embellish each other ; and that the female character is more or less imperfect if deficient in either. —G. P.

11th.—The dormouse seemed less inclined to sleep during the last return of frost, than before ; and since the weather has become a little more mild and warm, it seems to have laid aside its sleepiness almost entirely. During one or two slight frosts which lasted for only a day or two, it slept constantly ; and I think I may say from all our observations, that whenever the thermometer, which my uncle has attached to the cage, falls to 42°, the dormouse becomes inactive ; and if it falls any lower, he remains insensible. When the warmth of the room rises to 47° he is affected by the slightest touch, and is sure to waken in the evening and to eat heartily of his store, which I keep supplied with nuts, biscuits, and a little milk and water. When he is too lazy to put his mouth down into the cup, he has a very amusing method of drinking ; he dips his tail into the milk, and then draws it through his mouth. Last night he was so much alive that he very expertly repaired his nest, which had been a little deranged. On the whole, as my uncle says, it appears, that as soon as the necessity for sleeping is

removed, by artificial warmth and plenty of food, the torpid propensity of this little creature vanishes.

My aunt remarked that there are many well-known facts of animals being compelled by circumstances to relinquish their strongest characteristics; for instance, the hyena lives on the roots of *fritillary*, in the unfrequented parts of Africa; but, in the neighbourhood of inhabited places, he feeds on carrion: and the pied fly-catcher, which lives on soft seeds in this country, is well contented, in Norway, with flesh dried in smoke.

The rain, which was incessant for two days and nights, stopped yesterday, and a nice soft wind, with a warm sun, has so much dried the ground, that we have been out almost all the morning. I find that spring is beginning to advance. The buds of several trees are visibly enlarging, though it will be many weeks before they burst; the catkins of the hazel, which appeared, during the winter, like little short green spikes, are now lengthened, and so much more open, that each floret is to be seen separately, though none are yet expanded. When we were rambling through the hazel thicket, Mary showed them to me; and also the little buds which contain the flowers that afterwards produce the nuts, scattered up and down on the branches. It is curious that these flowers are so carefully preserved in buds, while the catkins are exposed without protection, during the whole winter.

The flower-buds of the peach trees are much swelled, the scales are almost separating, and, in some, there is even a streak of red appearing.

The tufts of leaf and flower-buds on the pear trees begin to show themselves more distinctly; and, on the larch trees, the little brown lumps are now growing larger, and preparing to let the nests of imprisoned leaves burst forth.

It is very odd how many interesting things are passed over, and not observed. There was a young lady here last week who lives in the country, and yet had scarcely noticed any of these small circumstances in Natural History, which distinguish the changes of the seasons, though she diligently walked out every day, for two hours, round the garden and shrubbery.

Notwithstanding my love for the rich and beautiful vegetation of Brazil, I do like the seasons here, and the sense of feeling of expectation that winter, dark and dreary as it is, gives of the welcome return of spring, with all its beauti

WEEK 28.

The Law of the Jews resembles the Cloud of Corruption of Man's Heart—Interior of Africa—Slaves—Winter Fauvette—Insects in Moss—Locust-eating Thrush—Flowering of Trees—Potato from Valparaiso.

Feb. 12th.—Sunday. My uncle, in conversing this morning about the peculiar situation and circumstances of the Israelites, said that the beneficence which graciously condescended to detail all their smaller duties in the law, might be compared to the cloud which continued to be their daily guide in the wilderness, directing them when to halt, and when to advance; for the law was their sure guide to lead them blameless through the journey of life, could they but have been obedient to it, and restrained their unruly and stubborn dispositions.

‘But perhaps,’ he continued, ‘there is not anywhere in the history of man a stronger proof of the corruption of his heart, and, at the same time, of the perfect free-will bestowed on him, than in the simple facts recorded in the history of the journey of the Israelites across the desert; when, at the very time they were under the immediate guidance of God, they so frequently murmured, and even rebelled, against his commands; thus exercising their own will, notwithstanding the threats and prohibitions, as well as the promises, conveyed to them by Moses.

‘The book of Numbers, you know, is so called because it contains an account of the two numberings of the people: the first of which took place in the second year after their departure from Egypt; and the second, in the plains of Moab, near the conclusion of their wanderings. It comprehends about thirty-eight years; but the principal historical events which it records happened at the beginning or the end of that period,—such as the death of Aaron, and the very interesting narrative of Balak and Balaam’s insidious attempts. It also describes the consecration of the tabernacle, and recapitulates the forty-two journeys of the Israelites in the wilderness, under the miraculous guidance of the cloud.

‘This book also contains several instances of the prompt severity with which God punished the rebellious murmurings and ungrateful seditions of the people. But amidst the exemplary terrors of those judgments, it sets forth, on every

occasion, the continuance of his fatherly mercy and goodness, in providing for their wants, in protecting and defending them, in holding out the consoling offer of future restoration to his favour, and particularly in the beautiful and comprehensive blessing which he appointed to be pronounced by the priests, and to which, lest any body should despise it, because uttered by a mere mortal, he annexed this gracious and distinct promise, "And I will bless them."

'The blessing,* probably, extended in its full meaning to after-ages, and seems to be capable of a more comprehensive interpretation than what appears in our translation. For it is very remarkable, that the name of Jehovah, which is three times repeated, has each time, in the original Hebrew, a different accent. Some commentators think that this refers to the three persons of the Trinity; and that it has a strictly parallel signification to the form of baptism which our Saviour established in "the name of the Father, and of the Son, and of the Holy Ghost."

'The three parts of this benediction, they say, will be found to agree respectively with the attributes of Three Persons. The Father being the source of all blessings and preservation, temporal and eternal. Grace and illumination coming from the Son, through whom we have the light of all true knowledge. And Peace, that is, the peace of conscience and inward tranquillity of mind, being essentially the gift of the Spirit, whose name, St. John says, is the Comforter.'

13th.—Everything relating to the interior of Africa is so interesting, now that such efforts are making to explore it, that I think you will be amused by a few lines from Mollien's Travels about a kingdom called *Fonta-diallon*.

He says, that the villages are like camps; there are but few cattle, and those of diminutive size; horses are unknown, and the ass on which Mollien rode spread terror through the country. There is not sufficient prey to invite the lion; and the surrounding mountains have never been crossed by the elephant: but hyenas and panthers are abundant; and monkeys people the woods.

The riches of the inhabitants consist in slaves, and they have some very singular establishments for them, which seem to show a much greater degree of humanity than I find in any other part of Africa. I will copy Mollien's own words.

* Numbers vi. 24, 25, 26.

' Les Rumbdés sont des établissemens qui font honneur à l'homme de l'humanité. Chaque village, ou plusieurs habitans d'un village, rassemblent leurs esclaves, en leur enjoignant de se bâtir des cases voisines les unes des autres ; cette réunion s'appelle *Rumbdé*. On choisit un chef parmi les esclaves ; ses enfans, s'ils en sont dignes, occupent sa place après sa mort. Ces esclaves, qui n'en portent que le nom, labourent le champ des leurs maîtres ; et lorsqu'ils voyagent, les suivent pour porter leurs fardeaux. Jamais on ne les vend quand ils sont parvenus à un âge un peu avancé, ou qu'ils sont nés dans le pays ; agir autrement, ce serait causer la désertion de toute la Rumbdé ; mais celui qui se conduit mal est livré au maître par ses camarades, pour qu'il le vende.'

14th.—It is only a fortnight since I first observed snow drops pressing up through the snow. Now, at every step, I find the early spring-flowers displaying themselves ; and myriads of gay crocuses, yellow, white, and purple, are bursting every day through the grass of the little lawn under the library windows. My aunt is going to paint a group of them, which I am to have the pleasure of gathering for her. Hepaticas, of all colours, are unfolding their little flowers, which have been so long coiled up, waiting for the gentle influence of spring. Periwinkle, and even polyanthus, are beginning to blossom ; and the sweet-scented mezereon bushes are thickly covered with the flowers which I saw quite formed in their little buds five months ago.

The weather has been for some days as soft and mild as it was cold and harsh a week since ; and this has rapidly brought out both birds and plants. Even my little dormouse has been more lively.

I have been reading a description of winter, which gives a more melancholy idea of it than I think it deserves.

' Winter, season of death, is the time of the sleep, or the torpor, of nature ; insects without life, reptiles without motion, and vegetables without verdure. The inhabitants of the air destroyed ; those of the water inclosed in prisons of ice ; and even the terrestrial animals, in some countries, confined in caverns and holes.'

I do not think that, in the depth of winter, all the little living creatures were so torpid as they are thus described ;

but the author nicely says, afterwards, 'The return of the birds in spring is the first signal of the awakening of nature.' I agree with him in that, as I have for some days observed that several birds have been singing in an under voice, as if trying their powers; even a thrush, early as it is, warbled a few low notes, for Mary and me, this morning. But there is a little brown bird, with a bluish, ashy-coloured neck, that for two or three weeks I have constantly heard, as it sits on a fir-tree near my window, loudly repeating its sweet, though unvaried song. It is the winter fauvette, or hedge-sparrow, which, however, does not belong to the sparrow tribe. The fauvette is described as a lively, amiable bird, very active, and to be found everywhere; in gardens, in thickets, and hedge-rows.

Numbers of insects, too, may be discovered. In our walks last month, we found many under the bark of trees, or concealed in the moss; and Mary told me that some of these are scarce in the summer months. We have often brought home, in our pocket handkerchiefs, great tufts of moss from the roots of trees; and, by shaking it over white paper, we have easily collected the insects.

I forgot to mention the golden saxifrage, or stonecrop, with which the shrubbery is bordered, and which is just beginning to flower; and in some of the hedges the sloe is coming into bloom. But, Mamma, even in the depth of winter, there was nowhere that appearance of death described by that melancholy writer; for the bramble retained its leaves, and gave a thin scattering of green to the hedges; while the berries of the wild rose, the euonymus, and the hawthorn, along with the pretty red dog-wood, gave everything a cheerful look.

I have often thought of the walk I had with my uncle in November, and of the quantity of things which he taught me might be found to observe, even in the worst seasons.

15th.—All this winter we have observed great numbers of the pretty little lady-bird, or *coccinella*, clustered together in a privet-hedge; they are generally collected at the joints of the branches, and at first I imagined they were red berries. Mary never observed so many before, and she therefore supposes that the *aphis* must have been uncommonly abundant last autumn. She tells me that the lady-bird is of great service—for in its larva state it feeds entirely

on aphides ; and when these mischievous grubs are very numerous, the multitudes of their pretty little destroyers always seem to increase in proportion. In 1807, they covered the cliffs at Brighton in such swarms, that the inhabitants were almost alarmed, not being aware that they came from the neighbouring hop-grounds, where their larvæ had been usefully employed in preying on the aphids, which had committed such ravages among the hop-plants, and which is there called *the fly*.—Their utility is so well known in France, that they are almost held sacred there ; and, indeed, they are so pretty as to be favourites everywhere.

Just in the same manner as the locust-eating thrush accompanies the locusts, so the coccinellæ seem to pursue the aphides : whether the latter cross the sea is not known ; but the coccinellæ certainly do, as they have often alighted upon vessels at sea.

17th.—I have just read a passage in Kalm's Travels in North America, which seems, in some degree, to confirm that opinion of Dr. Walker's, about the flowering time of foreign plants, which my uncle mentioned last week.

'The crab-trees opened their flowers yesterday ; whereas, the cultivated apple-trees which were brought from Europe had already lost theirs. The wild cherry-trees did not flower till May 12th ; but the European ones had opened theirs by the 24th of April. The walnuts of this country had neither leaves nor flowers, when the European kinds had both. Hence it appears that the trees brought over from Europe, of the same kind with the wild trees of North America, flower much sooner than the latter. I cannot say the cause of this forwardness, unless it be that they bring forth their blossoms as soon as they get the degree of warmth to which they have been used in their own country : it almost seems as if the native trees of this country are directed, by *experience*, not to trust to the first warmth of spring, while the flowers of the European trees are often killed by the late frosts.'

I read this passage to my uncle, and asked him if these plants did not seem almost to have instinct ?

He smiled, and said, ' I can give you another remarkable fact. The wild potato, from Valparaiso, flowers in the garden of the Horticultural Society, in October, which you know is the spring of South America. All these curious circumstances are manifest proofs of the wisdom of Provi-

dence, who has impressed on plants and animals the habits proper to the situation in which he placed them.'

I afterwards asked my uncle if the American fruits were very late in ripening, as the blossoms are so long kept back by winter?

'No,' he said, 'the summer is very warm, though the winter is long and severe; and, as animals become more sensible to heat, after being previously exposed to cold,—for the same reason that your hands glow on coming into the house after having been rubbed with snow—so vegetables seem to be excited to a greater degree of energy by the previous intense cold. Vines, in grape-houses which have been exposed to the open winter air, become forwarder and more vigorous than those which have been kept shut up in the house. In the northern latitudes, after the dissolution of the snow, the rapidity of vegetation would astonish you.'

'Clarke mentions in his travels in Scandinavia, that it is by no means uncommon for barley to be reaped in six weeks after it has been sown; for in summer the sun is so long above the horizon there, that there is scarcely any intermission of the warmth of the soil during the night.'

WEEK 29.

Meekness of Moses—His Punishment—Leaves essential to Fruit—
Coal Gas—Geology—Classification necessary—Tertiary Rocks—
Bee-Bread—A new Play—Hottentot-Bread.

Feb. 19th.—Sunday. 'While we are engaged in considering the history of Moses,' said my uncle this morning, 'I think we should dwell a little on a very striking part of his character, in order to imitate it, though, indeed, we can never be tried like him, in having the guidance of such a wayward and stiff-necked people. Bertha, guess to what quality I allude.'

'Perhaps to his meekness, which the Bible mentions as being remarkable,' I replied.

'Yes; meekness and spirit united. No man could have given more proofs of his courage than Moses. He slew the Egyptian who was killing one of his Hebrew brethren: he beat the Midianite shepherds, though alone and unsupported: he boldly remonstrated with Pharaoh in his own court, and feared not all the power of Egypt; but more

than all, when God commanded him to approach, he ventured amidst all the terrors of Sinai: and yet that Spirit which made and knew his heart, says, "He was very meek, above all men upon earth." Mildness and fortitude may well lodge together in one breast; it is not the fierce and cruel who are the most valiant.

'In the sedition of Miriam and Aaron, we see a beautiful example of his meekness, and of that true magnanimity which arises from it; and those very qualities are given as the reason why God avenged their ingratitude to Moses. Their trial must have been the more painful to him, because the enmity which he endured was from his own nearest relations. Yet he interceded for them, and God remitted the punishment which they had justly incurred. There, my children, is a pattern for you of that forbearance and generosity, which our Saviour afterwards so strongly commanded his disciples to exercise.

'If Moses himself excited the anger of the Lord at Meribah-Kadesh, by the distrust which induced him to strike the rock twice, as if doubtful of God's omnipotence—if even he could be guilty of such weakness, or could be provoked by the people to "speak unadvisedly with his lips," how much more, then, do all of us require a continual watchfulness of our hearts, lest we give way to the same kind of ignorant and presumptuous scepticism!

'The punishment of Moses, by prohibiting him from leading his people into the promised land, was peculiarly mortifying; and afforded an exemplary lesson to all Israel of the necessity of obedience, faith, and humility, to secure the favour of God. How severely Moses felt this infliction, and how meekly he bore it, appears from his humble, and it would seem repeated supplications to the Lord to reverse the sentence; but it was reserved for a greater than Moses to teach His disciples how to pray on such an occasion: "O my Father, if it be possible, let this cup pass from me: nevertheless, not as I will, but as Thou wilt."

'I think I have noticed to you, on a former Sunday, the perfect candour of Moses; in the present case it is again conspicuous. His offence, his punishment, and his entreaties are frequently alluded to in the Pentateuch, but are totally omitted by Josephus. In the original narrative they are mentioned as if necessary to explain the whole truth—they are expressed in sorrow and humiliation;—and the

ingenuousness with which both the crime and the disgrace are recorded by himself, form a striking contrast with the suppression of those facts by that cautious historian in describing the character of the great legislator, to whom he looked with so much reverence.'

20th.—Several insects of different kinds appear now on the fruit-trees, and are already beginning to do mischief to the little buds—some to those containing the leaf, and some to those of the blossom. When I heard this, I said, that if they could be picked off the blossoms, it would not signify much if some of the leaves were destroyed; but my uncle reminded me that the leaves are necessary to the nourishment of the fruit; for unless there are leaves to prepare the sap for that purpose, the fruit withers away.

It has been found, he says, by his friend Mr. Knight, that where a peach branch had only flower-buds on it, the grafting a leaf-bearing twig to its extremity, so as to produce leaves, was of great benefit to the young fruit. Mr. K. having also observed that a melon plant began to decline, which apparently had sufficient foliage for the nourishment of its fruit, he examined the plant more carefully, and discovered that a runner had grown out of the frame at one end, with an additional melon on it. He took this one off, and the rest of the fruit again flourished.

My uncle is going to try a new wash, which can do no injury, and which has been much recommended to him for destroying the various grubs and insects that are so mischievous to the fruit-trees. He sent yesterday to Gloucester, for some of the water through which coal gas had been passed; and he had three gallons of it mixed up to-day with one pound of flour of brimstone—to this was added soft soap, enough to make it adhere when laid on with a painter's brush. It was mixed over the fire, and it may be done so with perfect safety, he says, as it is not inflammable.

Many insects deposit their eggs in the bark, or in the young buds; and it is their larvæ or caterpillars that do the greatest mischief. The *aphides* injure all the varieties of plum; and there is a *coccus* sometimes in such quantities on those trees, that in summer every twig is thick beaded with little red, half-round specks. In spring the larvæ exhaust the trees by sucking out the rising sap. The grub of a little brown beetle destroys the blossom of

pear-trees ; and a saw fly injures the fruit so as to cause it to drop prematurely. In short, almost every kind of fruit-tree has its peculiar family of grubs, which, in their larva state, prey on the sap, the leaves, or the flower-buds ; and it is to prevent this that my uncle is going to destroy them by that gas-wash.

Among various enemies of the apple-tree, he showed me in particular the apple aphis, or American blight, which was not known in this country till the year 1787. It is a very minute insect, covered with a long cotton-like wool ; and fixes itself in the chinks and rough parts of the bark. It has spread throughout the kingdom, and about fifteen years ago destroyed such numbers of apple-trees in this country, that it was feared the making of cider would be quite at an end, if some mode of banishing those insects was not discovered. Spirit of turpentine, or smearing the branches with oil, were found to be useful remedies : but Sir Joseph Banks has succeeded completely by the more simple process of taking off all the rugged old bark, and then scrubbing the trunk and branches with a hard brush. My uncle has found this insect infesting two of his apple-trees : so he will try each of those methods as a fair experiment.

21st.—Caroline and I took advantage of a walk with my uncle this morning, to remind him of his promise to teach us something of geology.

‘Are you prepared,’ said he, ‘to learn the general classification? Though uninteresting till you know more, it is the necessary foundation to any knowledge of that science.’

‘Oh, yes, we are anxious to learn it, or any thing that you will be so good as to teach us.’

‘Very well,’ said my uncle ; ‘we will begin at once. In examining the surface of the earth, a person would at first imagine that the confused variety of mineral substances he saw was the result of mere chance ; but if in different places he should find the same substances constantly linked together—if, for instance, in traversing the different coal districts, he were to find sand, clay, chalk, freestone, coal, limestone, sandstone, slate, and granite, succeed each other with tolerable uniformity, he would soon perceive that there was something like system in their arrangement. And on further examination, he would discover that this general series may be subdivided into several lesser series or *forma-*

tions, in which, also, considerable regularity may be observed. The order, then, in which these series are classed by geologists, is what I am now going to explain to my little girls.

‘The first, or upper series, comprehends the mixed beds of sand, gravel, pebbles, and clay, which are frequently found covering the great chalk formation.

‘The second class includes several different series more or less connected with each other: the most important of them are—1st, the chalk formation; 2ndly, a series of sands and clays beneath the chalk; 3rdly, a series of calcareous freestones, such as Portland and Bath stone; and, 4thly, beds of red marl and sandstone, sometimes containing alabaster and rock salt

‘The third general class comprises beds of coal and the limestones and sandstones on which they repose.

‘The fourth or argillaceous class of rocks is characterised by their disposition to split into thin *laminæ*; such, for example, as the common roofing slate.

‘The fifth, and lowest, contains all the varieties of granite and gneiss.

‘These five series, or orders, have been named by one of our best geological writers, superior, super-medial, medial, submedial, and inferior. But the most general relation under which all these minerals present themselves, is that from which they have been named *primitive* and *secondary*. The primitive comprehends the lowest series of rocks, which serve as the basis upon which the others rest. They never contain any traces of former animals or vegetables, and may be supposed to have constituted the materials of the earth’s original surface.

‘On the other hand, the different series which cover them sometimes contain the remains of vegetables and animals imbedded in them; or sometimes they are made up of broken fragments of the primitive rocks, cemented together in a new form; and these are therefore considered to be of a subsequent and secondary origin. Geologists, however, having observed that between the primitive rocks, and those which exhibit most distinctly the characters of the secondary class, there are others partaking of the nature of both, and containing comparatively but few organic remains, have distinguished them by the title of *transition rocks*. And the rocks which are above this transition series they call

floetz rocks; a German term, implying their having been deposited in horizontal beds, or *strata*; while the strata of the older rocks were generally inclined at considerable angles. These *floetz* rocks were again subdivided into old *floetz* and new *floetz*; and to the new *floetz* other writers have given the name *tertiary*.

‘Though the distribution into the five series or orders, which I gave you, is, I think, the arrangement best suited to the science, yet it is necessary that you should recollect these other terms, because they are alluded to in almost every work to which you will have to refer. But I have given you quite enough for your first lesson.’

As soon as I came back from our walk, I wrote down all I could recollect of what my uncle had told us; and I have transcribed it here, in hopes that it may interest dear Marianne: this, at all events, will fix it more firmly in my own head.

22nd.—My aunt has just had some small plants of the *rosa Grevillii* put in the stove. This rose tree grows in the most rapid manner out of doors, and is a great ornament to the conservatory, one end of which it covers entirely with its bunches of small white flowers tinged with pink. It produced some shoots last autumn, of nine or ten feet in length, which the gardener bent downwards, and laying them in the ground, he conducted them towards the adjoining wall, to which he nailed up the ends. They now look healthy and have fine swelling buds, as if they would soon be in a very flourishing state. He has found that the way to manage this rose is to plant it in a sandy loam, and to keep it very closely nailed to the wall, just like the *Morella* cherry.

I take great pleasure in watching the progress of the garden. The peach blossoms are really opening, and are lovely. The gardener has been very busy protecting them from the harsh winds, and from rain and hail, by woollen nettings stretched completely over them. But my uncle is always trying some pretty experiments; and one small tree is covered, or at least its blossoms are covered, by wool attached to the branches. Another is covered by small branches of birch, about two feet long, which were collected as soon as the leaves were full grown, in the end of June, and preserved under cover. There are studs in the wall, which project eight or ten inches, and to these the birchen

branches are nailed with shreds. . In order to try these experiments fairly, the trees which he has selected for them are on the same wall and in the same aspect.

We have been watching the tomtits, and find that they really do eat up the insects and larvæ that would be destructive to the blossoms; but I cannot say so much for the pretty, but mischievous bulfinch, which too often amuses itself in picking off the flower-buds.

What endless entertainment, Mamma, there is in observing the operations of birds! For some days we had heard a bird in the low wet grounds, for ever going on with two notes, like the whetting of a saw; and at last we traced it to a place by the river-side, where there are some willow trees, and the remains of an orchard. We found it nestling in the decayed stems. Mary pronounced it to be the little black-capped marsh titmouse. We went two or three times to the old orchard, where we saw it very busy picking off little chips, in order to deepen a hole in a decayed willow tree for its nest; and I am told that it makes the bottom much larger than the entrance.

The birds of passage which came here for winter are now all taking their departure; and others will, I suppose, soon replace them. Frederick often points out large flocks of them at a great height: but it is the charming singing-birds that interest me: the blackbird, for instance, with its sweet whistle; and the thrush, who constantly varies his song. But still more, the missel thrush, the largest of the species, who, perched on a lofty tree, warbles a loud carol to the coming spring, with a very strong note. This bird is eleven inches long, and Frederick showed me that it is distinguished by its having the three outer tail-feathers tipped with white. It goes as far north, he says, as Norway; and is common in Russia. It is welcomed here as the harbinger of spring, and yet the country people call it the storm cock, because it is sometimes heard in stormy weather, drowning the voice of the other birds. It is particularly fond of building in old ash trees overgrown with lichens.

23rd.—Franklin is going to have several hives of bees, and is preparing an enclosure for them, in which there will be some of their favourite flowers: it is placed near a rivulet, as they use a great deal of water. They are particularly fond of mignonette, thyme, mustard, when left to go to seed, turnips, white clover, and beans of all kinds. These are

their principal favourites ; and it is said they afford the purest honey. Rosemary too is a favourite, but seldom produces much honey in this country, unless the season be warm and dry. It is worth cultivating, however, my aunt says, being one of the principal plants which gives the flavour to the famous Narbonne honey. She has had some planted in the warmest part of the bee enclosure, or Franklin's apiary, as Frederick calls it. There are several lime, poplar, and berberry trees planted round it ; and a broom hedge is sown outside.

In a new swarm, their first care is to build cells to serve as cradles ; and very little honey is collected, until an ample store of *bee-bread* has been laid up for their food. This is composed of the pollen or dust of the anthers of flowers, which the *workers* are constantly employed in gathering. They fly from flower to flower, to collect it in the little baskets formed of hair, with which their hind legs are provided ; and having deposited their booty in the hive, they return for a new load. This bee-bread, after it has been received into the bees' second stomach, is brought up again changed into a whitish jelly ; and with that substance the young brood are diligently fed by other bees, till they change into *nymphs*.

Bees do not solely confine themselves to flowers ; in collecting honey they are fond of the juices of fruits also, and for this reason my aunt recommended this bee enclosure to be placed very near the orchard which Franklin planted. With their tongue, which my aunt says is not a tube, as some people have supposed, but a real tongue, they lap or lick the honey, and convey it into the first stomach, which is called the honey-bag, and which, when full, is much swelled—it is never found in the second stomach. How the wax is secreted from the honey, or what vessels are employed for that purpose is not yet ascertained. But my aunt showed me the wax-pockets of the bee ; by gently pressing the body, we could perceive on each of its four segments, two whitish flaps, of a soft membranaceous texture, in which the wax is placed.

There is another substance made by the bees, and called *propolis* ; it is collected from poplar, birch, fir, and gummy trees like the taccamahaca. Bees have been observed to open the buds with their mandibles, so as to draw from

them a thread of viscid matter ; and then with one of their second pair of legs, they take it from the mouth, and place it in the baskets on their hind legs. It is used in stopping every chink of the hive, by which cold, or wet, or insects, can enter ; it gives a finish to the combs, and the sticks which support these combs are covered with it, as well as the interior surface of the hive.

In collecting the pollen from plants, it has been observed, that bees never mix the farina of different flowers ; each is made use of in separate little pellets, and it is said that skilful botanists have been able to distinguish by the farina what flowers the bee had visited.

My aunt told me that she had read of a lady who had so constantly attended to her bees, and was so beloved by them, that they seemed to delight in flying round her and listening to her voice ; they had no sting for their kind mistress, and when, after a storm, she gathered them up, wiped, and tried to revive them by the warmth of her hand, they gently buzzed their gratitude as they recovered. When she visited the hive, she caused no alarm ; and if, on seeing them less diligent than usual, or ill or languid, she poured a little wine at the outside of the hives, they always expressed their thanks in the same manner.

Franklin's new apiary, you see, has been of great benefit to me, for it led to a long conversation with my good aunt, who told me all those circumstances and many others in her usual clear way ; and when we came home she put into my hands a little book called *Dialogues on Entomology*, in which she says I shall find much useful information about bees and other insects.

24th.—At breakfast this morning my uncle received a letter from a brother of Colonel Travers, who you know is at Madras. It was written while he also was at breakfast, and Mr. T. mentions that there were then on the table eatables of different kinds, which had come from the four quarters of the globe.

This set us to consider from whence all the articles that were on our own table had been collected. Every one name something. The tea from China, the coffee from Arabia West Indian sugar, Narbonne honey, the salt from Cheshir and our home-made bread, butter, and cream. Then there were Coalbrook-dale cups and saucers, an urn from Birmin:

ham, tea-pots and spoons of Mexican silver, a butter-vessel of Bristol glass, knives of Swedish steel, and an Irish table-cloth and napkins.

Frederick proposed that we should calculate the number of people that must have been employed in producing all these various articles. He began with salt, as one of the simplest things on the table, and he easily ran through the operations of digging it out of the mine, making the little baskets in which it is sold, and conveying them by land or by water carriage to Gloucester; nor did he forget the wholesale and retail dealers, through whose hands they passed before they were deposited with my aunt's house-keeper. But my uncle reminded him that making fine salt was not only a far more complicated process than he seemed to imagine, but also that, unless he took into account the machines employed in every one of the operations, and even the tools requisite for making those machines, he would not be able to give a satisfactory answer to his own proposition. 'The same remark,' he continued, 'will apply to the production of everything else on the table: this roll, for instance, must not only include the labour of the baker, but that of the bolter, the miller, the reaper, the sower, and the ploughman, besides the manufacturers of all the implements they used. Or, take coffee, which, however simple the mere gathering of the berries and drying them in the sun may appear, can only be brought to this country through the complex operations of commerce, and by means of a ship, which of itself includes the combined efforts of a hundred different trades before she can proceed a single mile on her voyage.'

'How rich, uncle,' said I, 'must any country become, where the people are employed both in agriculture and manufactures!'

'Yes,' he replied, 'as long as they are well paid, or, in other words, as long as there is a demand for as much as they can produce. But you know, Bertha, the inhabitants of any country can only consume a certain quantity of food, or a certain quantity of clothes; and if the hands employed raise more corn, or make more goods than are wanted, they must be thrown out of work until the overplus has been called for, as no one will pay for what they do not want. Something else, you see, is necessary to enrich a nation besides agriculture and manufactures.'

'Oh yes! I know what you mean, uncle, I am sure—commerce—by which that overplus is sent to other countries, and exchanged there for things which we do want.'

'You are right, Bertha. The agricultural and manufacturing classes may furnish each other with the necessities, and with many of the comforts of life; but, without the aid of commerce, they can never raise a nation to any great degree of wealth. Foreign commerce is the great spur to their industry; it opens a thousand channels to their activity, and mutually enriches both themselves and the countries to which they trade. But it does much more—it brings distant nations into contact with each other—it makes up for the partial distribution of soil and climate—it may be said to equalize the bounties of Providence, and it is the grand means of spreading knowledge and civilization to the most remote corners of the world.'

25th.—In consequence of our breakfast conversation yesterday, on the productions of various countries, we invented a very amusing play in the evening, and I assure you that it was conducted with great precision.

Each person wrote on a bit of paper the name of some town, country, or province; these tickets were then shuffled together in a little basket, and whoever drew one out was obliged to give an account of some production, either natural or manufactured, for which that place was remarkable. This new-fashioned game was highly entertaining, for it brought out a number of curious bits of information which we had picked up, and which we might never have mentioned to each other, only from some such motive.

One of these was, that in Persia they have the art of carving spoons out of pear-wood, which are so delicate and so thin, that the bowl of the spoon can be folded up like paper, and opened again. The handles, too, are so slender, that it is a particular accomplishment to carry them, when full, to the mouth in such a dexterous manner as to prevent their breaking. These delicate utensils are one of the accompaniments of men of rank, being only used by princes and noblemen when sipping their sherbet.

My aunt, having drawn Siberia, said she had a match for Frederick's wonderful spoons. In the province of Wiatka, bowls and cups are made of the knobs which grow on the birch-trees; they are yellow, marbled with brown veins, and, when varnished, are very pretty. I

some of them are turned so extremely thin, as to be semi-transparent; and, when put into hot water, they become so pliant, that they may be spread out quite flat without injury, as they return to their original shape in drying.

The ticket for Constantinople was next drawn, and produced a description of the rose beads which are so much prized by the Sultan's wives, that they are usually called 'Beads of the Harem.' Those poor ladies have so little employment, that they sit for hours passing these beads, when strung, through their fingers. They are composed of the petals of the rose carefully picked, and pounded into a smooth paste in an iron vessel, which makes them quite black, on the same principle, you know, Mamma, that ink is made by mixing a preparation of iron with *gallic acid*, of which the rose-petals contain a small quantity. When the paste is quite smooth, it is made up into little balls, which are perforated for stringing, and then slowly dried in the shade. When they have become hard, they are rubbed in the palms of the hands along with a little attar of rose, till quite smooth; and they always preserve their sweet smell.

Paraguay was on the next ticket, and Wentworth, who remembers all he reads, gave us a description of the famous tea of that country, large quantities of which are used in Chili and the states of Buenos Ayres. It is called *Maté*, and is made by boiling the leaves in an oval-shaped metal pot, about twice as large as an egg, on the hot embers, in a brasier, which stands, at all seasons of the year, in the middle of the room. When the water boils, a lump of burnt sugar is added, and the pot being placed in a filagree silver stand, is handed round; each person drawing the *maté* into his mouth through a silver or glass tube, which is furnished, at the lower extremity, with a bulb, pierced with small holes. The natives drink it almost boiling-hot; and they have always some of this tea ready prepared, whether employed at home or in the fields. No one even departs on a journey without being provided with a quantity of the dried herb, as well as with a *maté*-pot, which is either carried in the hand, or suspended round the neck by a small chain, if the person is on horseback. I was rather ashamed to confess that all these circumstances were new to me, as well as that the tree is a species of holly, the *Ilex Paraguayensis*; but you will tell me if they are correct.

Then came Kamtschatka, which produced an account of the *Sarana*, a species of lily that is universal in the eastern parts of Siberia, and almost covers the ground with its blossoms. The bulbs are gathered in August, and laid by for use; after being baked, they are reduced to flour, and are not only used in soups and other dishes, but make the best bread of the country. Sometimes they are boiled and eaten like potatoes; and, besides their own exertions in collecting them, the Kamtschatkans have a provident little mouse, which not only hoards them in its magazines, but has the sagacity to bring them out in sunny weather to dry. The natives search for and seize on these hoards, but they always leave some of the contents for their poor little purveyors. There are several species of this lily, from one of which the Russians produce a sort of wine.

We had afterwards the *Apatea* or Hottentot bread, made from a parasite which grows on the roots of a *Euphorbia*, at the Cape of Good Hope, and which has neither stem nor leaf—only a flower that produces a large round and excellent fruit; but I really have not time to describe any more of these interesting little scraps, for my aunt says I must go out and walk.

WEEK 30

Balaam's Expedition with Balak—Worship of Baal—Perpetual Fire—Stratification—Out-crop—Formation—Flowering of Foreign Plants—Miss Percival—Letter from Upper Canada.

Feb. 26th.—Sunday. My uncle read to us, this morning, the history of Balaam's expedition with Balak, in order to curse Israel. This produced a long conversation; and I shall endeavour to give you an outline of what my uncle said.

'It appears from Scripture that there were two countries called Midian. That to which Moses had fled from the Egyptians was on the Red Sea; the other was on the River Arnon, near Moab; and as it was peopled by the descendants of Abraham and Keturah, we may suppose that the knowledge of the true God had been preserved there though mixed with idolatrous corruptions. We know that in the days of Abraham, and long afterwards, there was a priesthood amongst the Canaanites, who preserved in great part the true worship.

' In the age of Joseph, there was a priest of On, and in the time of Moses, Jethro, a priest of Midian, whose daughters they married; and it cannot be supposed that either Moses or Joseph would have been allowed to connect themselves with idolaters.

' It is not surprising, therefore, that Balaam should address the Lord as his God, though his worship was probably debased by superstition. It appears, indeed, from several concurring circumstances, that he was a real priest and prophet of the ancient patriarchal religion; but he was the last; for it had at that time become so corrupt, that it was necessary to separate the Israelites from the rest of the world, in order to preserve their religion.

' We have other instances to prove that this mixture of idolatry with the true worship did not hinder God from revealing himself to a few individuals who followed that mixed religion, as Abimelech, and also Nebuchadnezzar. Another proof that the patriarchal religion had not been sufficiently forgotten for its language to have become obsolete is, that Balaam's expressions bear a strong resemblance to those used by the other prophets; and that the epithets which he applies to the Supreme Being are the same as those employed by Moses, Job, and other inspired writers.

' But Balaam, though a true priest and prophet, was unsound in heart, worldly, and mercenary. His selfish disposition and degenerate character were probably as well known to Balak as his high qualifications as a prophet were to the people; and both well fitted him for a tool in the hands of that artful monarch. It was customary among the heathen, in those ages, at the beginning of a war, to devote their enemies to destruction with all the solemnities of religion; and, terrified by the recent victories of the Israelites, lest they should "lick up all, as the ox licketh up the grass," he applied to the venal prophet in his distress. He knew Balaam's eminence in the church, and his influence over the people; he knew that his interference might be purchased, and he bribed him to come and curse the invaders.

' Though Balaam was eager to obtain the proffered reward, and though he was flattered by the high opinion in which his blessings and curses were held, he well knew that they would be of no avail without the sanction of God. He, therefore, deferred giving any answer till he should have

consulted the divine will; and when that will was made known to him, he at once refused Balak's request, alleging that God had said to him, "Thou shalt not curse the people: for they are blessed." This refers to the blessing given to Abraham, Genesis xii., and which was afterwards renewed to Jacob, Genesis xxvii. Balak, however, was not discouraged by the first refusal. He repeated his invitation, along with promises of an unlimited recompense; and Balaam, having this time obtained the Divine permission, departed with the princes of Moab.'

I asked my uncle, why he was now permitted to go, since his proposal to do so before had excited God's displeasure?

'God often graciously stays the wicked in their sins,' said my uncle, 'or warns us when our inclinations are evil; but if we obstinately persist in indulging them, he then leaves us to our own free will, and abandons us to our foolish imaginations. Balaam had set his heart on the promised honours and rewards, and was unwilling to forego them, notwithstanding God's distinct prohibition; so the foolish man was allowed to follow his inclination, to proceed in his own way, and to complete his own destruction. Just in the same manner, when the Israelites afterwards demanded a king to reign over them, God graciously condescended to expostulate with them, and to warn them of the consequences: but they persisted—and, therefore, "in his anger, he gave them a king."

'But the fatal influence of covetousness and ambition, which made Balaam persist in desiring to go, soon led to his wishing to comply with Balak's desire to curse Israel. That he went with this secret design clearly appears from the angel's saying, "Thy way is perverse before me." So you see that God's anger was now kindled, not at his going, but because he went with a wicked intention. He was, however, suffered to proceed on his journey, in order to convince the surrounding nations that Balak's cunning devices were useless in retarding the progress of the Israelites, or in defeating the purposes of the "Most High who ruleth in the kingdoms of men."

'Balaam was afterwards also very blameable in offering sacrifice on heathen altars, in the high places of Baal, which he must have been aware was strictly prohibited.'

My uncle promised to take up this interesting subject again next Sunday; but on our way to church he told n

that these events happened in the year 1451 B.C., and about two centuries and a half before the Trojan war.

27th.—Frederick asked several questions, this morning, about the worship of Baal, on which he had been pondering since our conversation yesterday.

'Baal,' said my uncle, 'was the same as Bel or Belus. The name signifies Lord, and was originally applied to the Supreme Deity; but, in aftertimes, when idolatry became intermixed with the true religion, several of the heathen gods, and particularly the sun, were worshipped under that name. It was not only the general appellation of the sun throughout the East, but it extended from thence over great part of the Western world; and many remnants of the worship of Baal, both names and customs, are to be found at this day in the Hebrides and Western Highlands. *Baal-tine*, for instance, as Hertford mentioned in one of his letters, is an expression still in use—it means the fire of the sun; and several other vestiges of solar worship may be also observed there. The name given in Scripture to the temples of Baal signifies those high places inclosed within walls, in which a perpetual fire was kept.'

Frederick asked why groves and high places were so positively forbidden in the Bible as places of worship? To this my uncle replied, 'Because it was usual for those idolatrous nations to place their temples and altars in commanding situations, and to worship their false gods in the groves which were formed on those consecrated hills. Such places were well adapted to their mysterious rites, and the Israelites were enjoined to break their images, and cut down their groves; and were further commanded never to plant a grove near an altar dedicated to Jehovah. Peor, to which Balak took Balaam, was the most famous high place in Moab; and it was called Baalpeor, because there was a temple there dedicated to the worship of Baal.'

I asked my uncle why they selected hills for places of worship?

'Some learned men,' said he, 'have fancied that it was in commemoration of the resting of the ark on the mountain of Ararat, where Noah himself, immediately after the deluge, erected an altar, and offered burnt-offerings as testimonies of praise and gratitude. Thus, as every sanctified high place was supposed to represent Mount Ararat, so the sacred groves were symbols of Paradise; gloomy caves

became the representatives of the floating ark of Noah; and even islands acquired a sacred character, because the top of Mount Ararat had once been surrounded by the sea.'

28th.—Caroline and I have had a delightful walk to-day with my uncle, to a wild rocky valley, where the hill on one side appears as if a part had been violently torn away, and shows several layers, or *strata*, of different substances, in the cliff. He pointed it out as a good example of stratification; and made us observe that the strata, though parallel to each other, were not parallel to the horizon, but more or less inclined to it. The angle of inclination between these strata and the horizon is called their *dip*.

'Now,' said my uncle, 'if the strata *dip* in one direction, they must *rise* in the opposite direction; and if they continue to rise, that is, if their course is not interrupted or bent down, they must gradually approach the surface, and, in some place or other, they must show themselves there. Look at that well-marked stratum of reddish stone in the opposite cliff; though it is partially covered here and there by vegetation, yet you can easily trace it as it slopes upwards, till you see it actually arrive at the upper edge of the cliff. It is the same with all the strata which lie either above or below it: you see they rise successively towards the surface; and, if there be numerous other strata, under the valley, and which, therefore, we cannot see, still they also will reach the surface further off. The place where any stratum makes its appearance on the surface is called its *out-crop*; and, as they range themselves there in regular succession, you must at once perceive that, in examining the surface, in a direction crossing the strata, you would find as complete a section of them as you now see in the face of the cliff, or as you could obtain by boring perpendicularly through them.'

He said a great deal more on this subject, and helped us to follow with our eyes several other strata to their out-crop. 'This circumstance,' he added, 'is of immense importance to the geologist; for, if the strata were all horizontal, we should be ignorant of everything below the mere exterior crust of the earth. Sometimes, indeed, a deep well, or workings of a mine, might reveal the nature of the interior for hundreds of feet or yards; whereas, by examining the out-crop of the inclined strata, we can ascertain, only their succession, but their composition, for many re

in thickness. Another important consequence of this inclined distribution of the strata, is the variety of minerals which it enables mankind to obtain. If they were all horizontal, one country would be all marble, another all coal; but, by this beautiful irregularity of nature, everything that is useful approaches the surface somewhere or other, and puts itself within reach of the industry of man.'

'Are all the strata, then, sloped at this useful angle of which you speak?'

'Oh, no, Bertha,' my uncle replied 'they are inclined at every conceivable angle, from perfect horizontality in some places, to a vertical face in others.'

Caroline observed that even the strata at which we were looking did not all appear to have the same dip, and wondered what could be the cause of the difference. My uncle said she was quite right in the fact; the strata at the eastern end of the valley had evidently a more sudden dip than the rest. 'But,' he continued, 'it is to facts, my little geologists, that we must at first confine ourselves: though causes and theories are highly interesting, at present they would only bewilder you. Those numerous strata, however, will afford some illustration of what I told you a few days ago about *formations*. You see, by the frequent repetitions of the same substances in the cliff, that the same strata are frequently repeated, and in the same order. When this order is once known, the geologist is no longer perplexed by the number of strata; each throws light upon the other, and the whole combination receives the name of a *series*, or *formation*. By comparing several of these series together, a resemblance in relation and position will be observed between many of them, which will lead to a still greater simplification of the different classes.'

My uncle then changed the conversation; we begged of him to go on with his geology, but we could not persuade him. He said if we attempted to remember too much, we should lose the whole. 'Will you, then, give us a little lecture on it every day?'

'I will, with great pleasure, occasionally converse on the subject with both of you, my dear children,' said he; 'and, in our walks, or whenever a proper opportunity occurs, I will endeavour to give you a few general ideas of the structure of the globe. Hereafter we may, perhaps, enter more

minutely into the details of the science, and then it will be time enough to talk of daily lectures.'

March 1st.—My dear Mamma has often laughed at me for my love of little coincidences; and I have now a new one to tell her. I very lately mentioned in my journal some remarks made by Dr. Walker, of Edinburgh, on the seasons of the flowering of foreign plants; and this morning my uncle happened to see in the newspaper the following extract from an address to the Agricultural Society of St. Helena, by General Walker, who is the son of that ingenious doctor. My uncle desired me to read it, and said that these speculations are very useful to inquiring minds: they furnish hints, and they naturally lead to new experiments, which elicit new facts.

'The functions of plants, as well as animals, depend on the air in which they live. I have observed that those of St. Helena which have been brought from another hemisphere are very irregular in their annual progress; many of them, in the development of their foliage, have adopted the law of nature peculiar to the country into which they have been transplanted—others, more obstinate, remain faithful to their former habits, and continue to follow the stated changes to which they had been accustomed. They all appear to maintain a struggle, either before they adopt the habits which belong to the seasons of their new country, or decide on retaining their relations with the old. In yielding to external circumstances, they appear to have different tempers.

'This is often observed in plants of the same species appearing to hesitate before they adopt the mode of performing their functions. And, when their decision is made, we are at a loss to discover an adequate cause. For instance, an oak raised from English seed loses its leaves in a St. Helena winter of 68°; yet it experiences nothing like the difference of temperature which, by analogy, might be supposed to cause that change.

'It would add to the natural history of vegetation, and improve our knowledge of the geography of plants, were the facts concerning their habits and changes, under different temperatures, carefully collected.'

2nd.—Miss Perceval, with whom I recollect you used wish me to be acquainted, has come to spend a few weeks

here ; and I shall now not only have the pleasure of knowing a person you like, but of taking many a botanising walk with her as the Spring advances. She seems very gentle, and so unwilling to put herself forward, that my uncle is obliged to reproach her for withholding the stores of knowledge which she possesses ; and he generally leads the conversation to such subjects as will make her display them a little, in spite of her diffidence.

She disclaims all over-modesty, but says that such has been the progress of knowledge within the last ten years, and so greatly has it become diffused through all classes, and particularly amongst females, that she feels that almost everybody knows as much as she does ; besides, she added, ' I have lived so completely out of the world of late, that I have really much more to learn than to teach.'

She speaks of you, dear Mamma, as of an old and valued friend ; and I think she will be kind to me for your sake.

4th.— Miss Perceval has been so much interested by a letter which my aunt received yesterday from her friend in Upper Canada, that she petitioned for some of her former letters ; and my aunt has permitted me also to see them and to make some extracts for you, dear Mamma.

During their progress in open boats up the St. Lawrence, Mrs. * * * soon began to feel the hardships of a Canada life ; she and her family generally preferred sleeping on fresh hay, the beds at the inns were so full of vermin. Sometimes they even slept on the ground, sheltered from the night air only by an awning ;—and more than once in their open boat under a heavy dew. She speaks of the farmers with great gratitude ; whenever she stopped at their houses she was received with the kindest hospitality, and her children plentifully supplied with milk and good bread. Throughout her journal, which I wish you could read, and in all her letters, there is the most amiable disposition to make the best of everything, and to enjoy whatever little comfort she could find in her situation, without looking back on her former very different life. In October they settled at the town of Cobourg, near Lake Ontario, as a temporary residence while a house was building for them on the land they had obtained. She describes her house thus :—

' Cobourg, Oct. 30.

' There are three rooms on the ground floor, and four above, but they are so small they are like little closets ; we

contrive, however, to squeeze into them, and though we shall be here two months, we can easily reconcile ourselves to these little inconveniences.

‘There is a nice grassy place in front of the house, it is paved in, and the children can play in it with safety: that is one great comfort. We found some boards in the barn, and Mr. * * *, whose old tastes as an amateur mechanic are now very useful, has made temporary shelves and tables of them. We have at present neither table, chair, nor bedstead, the carriage of these articles was too expensive for us; but we have screws and all things ready, to make them when we are settled in our loghouse, for which I long as ardently as if it was a palace.

‘Our bed-rooms have no doors, but we hang up blankets, which answer the purpose. Fortunately we have plenty of these, and the air is so dry that we do not suffer from the cold, though the nights are frosty, and not a fire-place in the house, except that in the kitchen. The frost has given the woods a grey look, instead of the beautiful orange autumnal tints they had before.

‘Four years ago, there were but two houses here; now it is a nice thriving town, with a neat church, a large school-house, and some very good shops, or *stores*, as they are called; and the houses are in general very neat.

‘We have been visited by several respectable families. There is a gentleman here who was for twenty-five years engaged in the North-west or fur-trade, and during that time he never once returned to his family. He had left home at the age of thirteen, and underwent all kinds of adventures and hardships. One winter, when their provisions fell short, he and his companions were obliged to eat their leather aprons, and even the leather of their shoes!’

‘*Cobourg, Jan. 1st.*—We have been detained here longer than we intended; first by the illness of my eldest girl, and next waiting for snow to make the roads fit for travelling; at present they are in such a state of roughness, from the hard frost after the heavy rains of last month, that the jolting of either cart or waggon could not be borne. There are no covered carriages here. In winter, *sleighs* (sledges) are used, or waggons, which are neither very nice nor easy. They are very roughly made, with two seats placed across, one before the other, and have rather an odd appearance for gentlemen’s *carriages*.

'This new year's day, I hope you are all as well and happy as I am; and I am sure it will give you pleasure to know, my beloved friends, that we could indulge ourselves by going to church on Christmas-day, and receiving the sacrament. Do not imagine that in this banishment, as I fear you still consider it, these duties are neglected; far from it; we have a church near us, and, I thank God, the inclination to make use of it.'

WEEK 31.

Balaam continued—Parable—Rhinoceros—Reem—Geology—Older Formations—Twigs flower in Water—Connexion of Botany and Gardening—Volcanoes.

March 5th.—Sunday. The subject of Balaam was continued this morning; and I took an opportunity of asking the meaning of the word *parable*, as it is used in Numbers xxiii. 7.

'It has more significations than one,' said my uncle, 'in both the Old and the New Testaments. It sometimes implies that sort of address to the people, which, from its tone of authority as well as from its elevated language, seems to have been the effect of inspiration. Thus Balaam is said to have taken up his parable, when, contrary to his own wishes and in a style approaching to poetry, he uttered his sublime prophecies. The Psalmist also, after saying, "I will open my mouth in a parable," gives a rapid, but magnificent sketch of the wonders that God performed for the children of Israel. Secondly, we find it applied in the Greek Septuagint (1 Kings iv. 32) to those short sententious sayings of Solomon, which in the English version are called proverbs. And in Ecclesiasticus, our translators have rendered the same Hebrew word in some places by "parables," and in others by "wise sentences." Thirdly, in the Gospel it is used in the sense of an apologue or fable; a mode of conveying instruction, or of explaining certain doctrines, which our Lord thought proper to adopt; and which had been frequently employed by the Prophets in the Old Testament.

'It was in the first of these three senses,' continued my uncle, 'that Balaam appears to have taken up his parable. Having stated why he had come to Moab, and having confessed that he could not curse those whom God had not

cursed, he immediately prophesies the increase and power of Israel. "Lo, this people shall dwell alone, and shall not be reckoned among the nations." Had he not been inspired, how could he, on a distant view of a people he had never seen before, have discovered the peculiarities which distinguished the Israelites and their posterity to the latest ages? Their religion and government were then unknown; yet he foretold their entire separation from all other nations; and the present state of the Jews, and all history confirm the truth of his prediction.'

I asked my uncle why Balak desired the prophet to go with him to *another* place to curse them?

My uncle said, 'that it was the opinion of the heathens, that if one victim failed, or if the Deity was unpropitious at one place, he should be importuned by a repetition of the sacrifice elsewhere. Balaam, therefore, to gratify the king, repeated the same experiment a second and a third time; but still with the same disappointment.'

Caroline made some remark on these words, 'He hath as it were the strength of the Unicorn?' and my uncle said, 'It is not known with certainty to what animal the strength of Israel is here compared; some have supposed the unicorn to be a kind of single-horned antelope, others think that it is the rhinoceros; but if any of you will remind me of the subject some other day, we will endeavour to see which is the best founded opinion. Balaam afterwards compares the power of Israel to that of the lion; and both seem to allude to the victories by which the Israelites should gain possession of the land of Canaan. It is remarkable, that the inspired language of Balaam very much resembles that which Jacob had used in his predictions respecting Judah. Such is the harmony and connexion between the prophecies of Scripture.'

6th.—We were resolved not to defer the subject of the unicorn; and this morning we began by searching for as much light on the subject as our books could give us, that we might be the better qualified to discuss it with my uncle.

I found in Perceval's *Cape of Good Hope*, that notwithstanding all the assertions he had heard of the existence this animal in Southern Africa, he never met any person who had seen one. A horn, nearly three feet long, was indeed shown him, as being that of the unicorn, but it evidently belonged to a large species of antelope. My uncle aft

wards told us, that there is an antelope of this kind in the mountains of India, which the natives used to pretend had only a single horn; but since the conquest of Nepaul, those mountains have been visited by English officers, who have seen the animal alive with both its horns.

Frederick produced Mr. Barrow's description of a drawing he had seen at the Cape, representing a single horn projecting from the forehead of an animal, which, he says, resembles a horse, with an elegantly shaped body, marked, from the shoulders to the flanks, with longitudinal stripes or bands.

Mary had collected a great many facts about the rhinoceros; and she made it appear pretty clearly, that the allusion in Scripture to the strength and untameableness of the unicorn, are much more applicable to the rhinoceros than to any species of antelope, all of which are remarkably deficient in strength, and naturally timid. She found in some book that the derivation of the Scripture name *Reem*, both in the Hebrew and the Ethiopic, implies erectness; and though the rhinoceros is by no means a very erect animal, yet, his horn certainly is so, as it stands perpendicular to the face; and in that respect, it differs from the horns of all other animals. 'The upright direction of the horn,' Mary said, 'as well as the power and fierceness of the rhinoceros, would equally justify the metaphor in the Psalms, "My horn shalt thou exalt like the horn of a unicorn."'

Caroline then brought forward her authorities to prove, that in Abyssinia, the name of the rhinoceros signifies the beast with *the horn*, implying that it has but one; whereas, in Nubia, the name expresses *horn upon horn*. But as the Septuagint translates the word *reem* into *monoceros*, or unicorn, we may suppose that if the rhinoceros had always two horns, the writers of the Septuagint, who probably must have seen the animal at Alexandria, at the exhibition given by Ptolemy Philadelphus, would not have called it *monoceros*.

We proceeded with our gleanings to my uncle, who seemed pleased with our industry. He observed, that notwithstanding the translation in the Septuagint, it was not quite certain that the reem or unicorn of the Hebrew Scriptures was always mentioned there as having but one horn; and he pointed out a passage in Deuteronomy, where horns in the plural are distinctly expressed. 'But,' said my uncle,

'it is classed' with the behemoth and leviathan, which are supposed to be the elephant and crocodile, and the savage rhinoceros seems to be a more suitable companion to those huge and terrific creatures than the delicate antelope. Every body knows that there are two species of that animal, the *R. unicornis*, and the *R. bicornis*; and that the latter is only found in certain parts of Africa. The former, or one-horned species, is common not only in Abyssinia, but all over Asia, and in Arabia is called by the name of *reem*, to the present day. Why then should we doubt that this untamed and destructive animal, which in every respect answers to the description in Scripture, should be the unicorn mentioned there; and having a horn, or horns, according to the different countries where the allusion was made?"

My uncle then showed us Sparrman's account of the two-horned rhinoceros which he killed and dissected at the Cape. The longest horn, which is close to the nose, measured about eighteen inches in length, and seven in diameter. The uppermost horn was much smaller, and much worn, and the Hottentots told the Doctor, that these animals had the power of turning the long horn aside out of the way, while they employed the other in rooting up the plants on which they feed. But my uncle does not believe that there is any truth in this assertion.

7th.—I have just had a little geological lecture, and hasten to write the substance while it is fresh in my memory.

In examining the materials of which our great mineral masses are composed, we are immediately struck by the difference of the *older formations*, which proceeded from causes that have long ceased to operate, and those *newer formations*, the causes of which are still at work under our own observation.

Compared with the former, these recent formations are of very limited extent; they consist of the sand and stones that are accumulated on the sea-coast by tides and currents; of the land washed away from one bank of a river, and thrown up on the opposite bank by the winding stream; of the earth and gravel, and fragments of rock, carried down by all rivers, and forming deposits at their mouths; and of the constant increase of marsh land, in consequence of the growth of aquatic plants. All these appear to have proceeded uninterruptedly from the period when our continent

assumed their present form, and may be all designated by the general term *alluvial*. There are vast alluvial formations at the mouths of the Ganges, the Nile, the Mississippi, the Amazon, and other great rivers; and an evident change has been effected by these means in many sea-coast countries, of which there are innumerable instances.

The overflowing of the Rhine, the Arno, and the Po, formerly dispersed the soil they carried down over the neighbouring land; but ever since it has been confined within dykes, their deposits have not only elevated the beds of these rivers, but are also rapidly pushing forward their mouths into the sea. The low alluvial plains through which they run were themselves produced by ancient deposits; and the progress of this continually increasing formation may be easily estimated from various historic records. From Strabo we learn that Ravenna was situated, in the time of Augustus, at the head of a bay connected with the Adriatic, and that it had then a good harbour; yet it is now three miles from the coast. By comparing the old maps with the present state of the Duchy of Ferrara, which is flooded annually by the Po, it appears that the coast has gained from the sea 14,000 yards in breadth since the year 1604, giving an average of sixty yards for its advance per annum. And the town of Adria, which in ancient times was a sea-port, is now sixteen miles inland!

The same causes have produced similar effects along the branches of the Rhine and Maëse; and for many leagues from their mouths the country exhibits the singular spectacle of having its largest rivers held up by dykes at the height of twenty or thirty feet above the level of the land. The alluvial depositions on the north coasts of Friesland and Groningen, and the increase of land which they have effected, are very considerable; the first dykes were formed in 1570; and in only one hundred years afterwards, the deposits had accumulated to the extent of nearly three miles on the outside of the dykes. A large part of the United Provinces has thus been actually formed by materials washed down from the interior of Germany; and many populous cities now stand where the sea once rolled its waves.

8th.—Of the various buds which are beginning to open, none advance so rapidly as those of the peach blossoms. On the 14th of February I first observed a little streak of

red at the tops of a few; they are now quite opened, and looked very pretty last week, when the ground was slightly covered with snow.

I must tell you a curious thing about buds. Early in January we had some little branches and twigs of several trees brought in, that we might see the state of the buds; and I put a few into a jug of water in my room, that I might examine them at leisure. Very soon afterwards, I perceived that the buds were beginning to swell; their scales gradually separated, and now there are some horse-chesnut leaves quite opened out, and displaying the beautiful manner in which they, and the embryo flower, were folded up and preserved within those scaly cases in the winter. I thought it very extraordinary that they should have been supported merely by water; but my uncle says that the principal nourishment of all plants is derived from water. The famous botanist, Du Hamel, reared an oak tree for eight years in water only; and a willow planted by Van Helmont in a pot, increased fifty pounds in weight in five years, though the earth, which had been accurately weighed, was only diminished by two ounces.

In my collection of branches there were some of lilac and of pear; and on each of these, the buds, which were hard, little greenish knobs when first put in the water, have now burst open and disclosed their cluster of miniature flower-buds.

We have all been employed in dissecting and examining leaf-buds of various trees; for my own part, I think that I can distinctly see in most of them that they proceed from the wood; and in some I could plainly trace the little communication that connects the wood and the bud. But my uncle says we must continue to study this subject for years before we can venture to form a decided opinion.

I intend to keep my branches in water as long as possible, that I may see what happens at last. On the living trees out of doors, no leaf-bud has yet attempted to unfold its scales.

9th.—As we walked in the sheltered kitchen-garden this stormy day, Miss Perceval remarked what an alteration soil, climate, and culture can produce in the external characters of plants; and for remarkable instances of this, she says, we need not go farther than the kitchen-garden.

'There,' she said, 'we find cabbage, cauliflower, kale

brocoli, and turnip-rooted cabbage; but who could ever imagine that all these were from the same original species? Nothing, however, is more certain than that they are all varieties produced by the cultivation of a plant which grows wild on the sea-shores of Europe, and which, in its external appearance, is as different from any of those, as they are from each other. These alterations become so strongly fixed by habit, that they continue in the plants that spring from the seeds of each variety; they are liable, however, again to degenerate into each other; and it is only by the art of gardening that they are preserved distinct, or that fresh varieties are produced.'

Miss Perceval made me examine the several young crops of cabbage of different kinds, which had been sown at short intervals during February and the beginning of March, that they might be ready for use in succession; and I find that, although she is such a great botanist, she does not at all despise the knowledge of garden vegetables and of their cultivation. Indeed, she says that it is being but half a botanist, not to have a general knowledge of all the useful vegetables, with the principles of their cultivation, and their times and seasons.

Among the few plots of cabbage now in leaf, we found some rows of the large-ribbed species, in which there appeared to be several varieties; and in trying to make out the differences, I perceived an odd tail or appendage to some of the leaves. When I made Miss P. take notice of it, she was surprised, and said she had never before observed a similar circumstance in the growth of any cabbages. This curious appendage, which grows from the back of the principal rib, in its substance is like the footstalk of the leaves; and at the end it dilates into a sort of hollow cup like a funnel, with something of the appearance of the *nepenthes*, or pitcher plant.

11th.—I asked my uncle, after dinner, what were those older causes, which he told us had produced such infinitely greater changes in the structure of the earth's surface than any that are now going on.

'The more you learn,' he replied, 'of the structure of the earth, and of the prodigious thickness of the strata, which once must have lain horizontally, and which have been since torn up and thrown into every angle of inclination, the more readily you will form an idea of the stupendous

power with which that cause must have operated. The changes which are now in constant progress are very limited in their effects, and are entirely confined to the surface. The action of frost in crumbling the rocky tops of the mountains, and of rivers in carrying the fragments to the sea, and thus altering the outline of the coasts, I have already mentioned. Considerable changes are also produced by avalanches, by inundations, and by the unceasing action of the waves of the sea. But these changes are slow, and can never be very extensive. The effect of volcanoes is greater; and though many countries bear the traces of having been overflowed by vast torrents of lava, they are now confined to a comparatively small portion of the globe. But if they were far more numerous or extensive, volcanoes could not have raised up or overthrown the strata through which their apertures pass, still less could they have acted upon those immense regions which are not volcanic. The mind, indeed, is lost in astonishment at the means employed by nature in feeding these enormous fires from such prodigious depths; but still we must perceive how inadequate they are to account for the revolutions which appear to have shaken the earth to its foundations. The same reasoning applies to earthquakes; their consequences are awfully great in the adjacent country, but very far from being equal to explain the subversions which appear to have occurred in every corner of the world that has been visited.

‘In short, all the greatest possible effects of those causes that can be supposed to have taken place since the creation, cannot have inverted the strata, nor inclosed great quadrupeds in solid stone, nor imbedded bones, shells, and vegetables in the middle of compact rocks, nor have deposited complete strata of shell-fish at the tops of the highest mountains; nor could they have swept away whole species of animals which once inhabited the earth; causes, which evidently extend through a limited space, and whose effects are only partial, could never have operated throughout the globe, to produce the general and amazing changes that we observe in all parts of it. To produce such a universal effect, the cause must have been not only powerful but general.

‘Sacred history alone furnishes us with the knowledge this general and powerful cause—the Deluge. What physical means Providence employed to produce this great co

vulsion, have not been revealed to us, but that the whole globe must have been involved in its fury is everywhere apparent. The former bed of the ocean must have been lifted up; former continents must have been sunk; and the entire crust of the earth must have been rent, shattered, and tossed into every variety of position.'

WEEK 32.

Balaam's Ambition and Weakness—Talents considered as Temptations—Aphis and Ant—Organic Remains—Canada Letters continued—Beetle and Wood-boring Bee—Teredo—Thames Tunnel—Illness of Bertha's Aunt.

March 12th.—Sunday. 'And Balaam rose up, and went and returned to his place.'

'The place alluded to here,' said my uncle, 'was his own country, Mesopotamia. His prophecies having been delivered, the design of Heaven was answered, and the instrument was thrown aside. The wicked Balaam was now left to pursue the schemes of his ambition; and they were intended to be as destructive to the Israelites as if he had even succeeded in cursing them. Josephus tells us, that Balaam informed the king that he could never subdue the Israelites, unless they should be disobedient to their God; and he instructed him how to make them so. This seems to be confirmed in Sacred History by Moses, who says that Balaam "caused the Israelites to commit trespass against the Lord," and also by St. John, in the second chapter of Revelations. The consequence was a severe plague, which was inflicted on them as a punishment, and which swept off many thousand people.

'The history of this obdurate Prophet furnishes a deplorable instance of the weakness of the human heart, and of the obstinacy with which it clings to sinful passions, in spite of the most solemn warnings. Balaam could not forego the tempting offer of Balak, nor the allurements of his own ambition; after having been refused permission to go to that king, and after having been obliged to bless the people instead of cursing them, he endeavoured, by his mischievous counsel, to seduce the Israelites into idolatry. He expressed, indeed, a hope of dying the death of the righteous, but for that purpose he should have lived the life of the

righteous. He was cut off by the avenging sword; and his end furnishes an awful example of the gradual progress of sin, and proves that extraordinary "gifts of the Spirit" are not always accompanied by the genuine "fruits of the Spirit." When we possess extraordinary talents, or any peculiar gifts from Providence, we should consider them as so many temptations or trials, and pray the more humbly and strenuously for assistance to use them virtuously.'

My uncle then explained that to tempt, is an old English word, which signifies to try; it is frequently so used in all our old works, as well as in the Bible. The forty years' temptation in the wilderness evidently means trial. Forty years long did I tempt and prove thee—that is, did I try thee. Again, in the text, 'to take him a nation from the midst of another nation, by temptations, by signs, and by wonders,' Deut. iv. 34. The word 'temptations' is undoubtedly put for trials; for the miracles wrought in Egypt were real trials both to the Egyptians and to the Israelites, who were thereby given the alternative of obedience, or of obstinate resistance. And St. Paul repeatedly tells us, that even good men are allowed to fall into *trying* circumstances, for the exercise and improvement of their virtue.

13th.—My aunt has been showing me various species of the aphid to-day.

There are two distinct sorts which belong to the plum tree, one of a yellowish green, with a round short body; the other oblong, of a bluish green, enamelled with white. The same kinds are found on the gooseberry and currant; and the rose tree supports three distinct species

There are some amusing circumstances told of the singular friendship that appears to subsist between these little animals and ants, with whom they share the honey they obtain, and are in return assisted and protected. I met this morning with an entertaining account of these facts in the Dialogues on Entomology, which my aunt lent me last month.

There is another species called the oak puceron, which bury themselves in the crevices of the bark when it is little separated from the wood, and live at their ease on the sap. They are black, and nearly as large as a common house-fly. Their trunk is twice the length of their bodies and it holds so fast by the wood, that, when pulled away it frequently brings a small piece along with it. Ants a.

so fond of this species of puceron, that they are the surest guides where to find it; for whenever we see a number of ants upon an oak, and all creeping into one cleft of the bark, we may be certain, my aunt says, of finding quantities of oak pucerons there.

Mary, two or three days ago, raised the turf in different places, in a dry pasture field, and showed me clusters of ants gathered about some large grey pucerons. My aunt says that these earth pucerons draw the juices from the roots of plants, as the other species do from the stem and branches. It is imagined by some people, that they are only the common pucerons, which, in winter, creep into the earth to shelter themselves: but this is not the case, as they are usually met with in places distant from the trees or plants on which they might before have fed. And she says, that though many may be killed by the cold, yet numbers escape, and are found early in spring, sucking the buds of the peach and other trees.

14th.—I have not yet found the least difficulty in comprehending what my uncle tells us in our geological conversations. This is partly owing to the clearness with which he teaches; and partly to my immediately writing down the substance of it for you. The habit of writing this journal has been indeed of very great use to me, and I have to thank you, dear Mamma, for desiring me to do it. I am afraid Marianne will not be much interested as yet by the present subject, for want of my uncle's explanations; but when I am once more with you and her, I will try to give her at full length the details of what he has told us; and I am sure that she will then like it for his sake.

We have just had another little chapter on the changes in the globe. My uncle said, that extraordinary as the changes on its surface appear, yet when we have an opportunity of penetrating a little into the interior by means of deep mines, or of viewing a long section of the strata in cliffs or on bare mountains, then our ideas expand into a clearer conception of the extent and grandeur of its ancient revolutions. In examining the more elevated chains of mountains, or in following the beds of their torrents, we can perceive somewhat of its interior structure thus laid open to us.

The low and level parts of the earth, when penetrated to a great depth, generally exhibit parallel strata, composed of various substances, and most of them containing vegetable

and animal, and innumerable marine productions. Similar strata, with the same kind of productions, compose the hills even to a great height; and sometimes the shells are so numerous, that an entire stratum seems to be formed of them. These shells are frequently in such perfect preservation, that they retain their sharpest ridges, and their tenderest forms. They are sometimes found incrustated in hard stone, and sometimes inclosed in loose sand or clay; and the nicest comparison cannot detect any difference between the texture of these shells, and those which now inhabit the sea. It is, therefore, fair to conclude that they also must have formerly lived in the sea, and, consequently, that the sea must once have flowed over those places.

But we must not forget that in some countries none of these remains occur, for instance, in Cornwall, and the highlands of Scotland; while in others, not a well can be sunk, or a pit opened, without presenting them in abundance; as in the south-eastern counties of England. The reason of this difference will, I am sure, have suggested itself, if you recollect our former conversations; Cornwall is composed of the lowest series of rocks, which are therefore called primitive: and they, you know, must be entirely destitute of organic remains. The next series contains them very sparingly, but they abound in the three succeeding series, or what are called the *secondary formations*; though sometimes there are beds interposed, in which they are still rare. In examining these organic remains, the skill of the botanist and zoologist has discovered that several of the plants and animals are entirely different from any with which we are at present acquainted; and a vast field of inquiry has thus been opened in those departments of nature.

I asked my uncle whether these remains are regularly distributed through the whole of those series in which they are so numerous. He likes that I should ask him questions; he says it doubles his pleasure in giving information, when he sees people really alive to what he tells them.

He replied that, in one respect, the regularity is surprising, for they are found, as it were, in families; each formation containing a collection of species often peculiar to itself, and differing widely from those of the adjoining one so that at any two points, in similar formations, however distant, we are sure of meeting the same general assemblage of fossil remains. For instance, if the fossils found

in the chalk of Flamborough Head in Yorkshire, or in the cliffs of Dover, or even in Poland, or Paris, be examined, eight or nine species out of ten will be found to be the same. Again, if collections of fossils from the *carboniferous* limestone, of any of the above places, are compared, they will be found to agree in the same manner with each other: but if you compare the collection from the chalk, with that from the limestone, you would not find one single instance of agreement; indeed, very few appearances of it that could deceive even your unpractised eye.

'I wish, uncle, I could make these curious comparisons with my own eyes.'

'So you shall, my dear Bertha. I have a few specimens of remarkable fossils, though I have no regular collection; and when we reach home, I will endeavour to show you some instances of these facts, as they interest you and Caroline so much.'

15th.—I have made another extract from the Canada letters for my dear Mamma.

"Loghouse, February 24th.

'Here we are at last; and though we must bear a good deal of inconvenience for some time, yet we feel all the enjoyment of being really *at home*.

'On Monday morning, Feb. 10, we left Cobourg. Mr. * * * and I on one seat, with a little girl between us; the maid and the other two children on the seat before us, and our charioteer in front. We had blankets and cloaks to roll about our feet, and a basket of cold meat and bread. Another sleigh carried our bedding, trunks, and luggage, besides baskets of poultry, and our two dogs.

'We travelled twenty miles that day very pleasantly; passing through miles and miles of forest. I was delighted with this new scene. Every now and then we came to small *clearings*, with loghouses, and generally with a good stock of cattle and poultry.

'At four o'clock we reached the inn; and we passed the night there very comfortably, sleeping on the floor in the sitting-room, where we spread our mattresses and blankets.

'Next day, our road lay through thick woods; indeed, it scarcely deserved that name, for it was merely a track through the snow where other sleighs had lately passed.

We turned backwards and forwards through the crowded trees, and often had showers of snow from branches which our heads touched: the boughs of the beautiful hemlock-pine were so loaded with it, and bent down so low, that we were obliged to lie down to pass under them; and twice we were obliged to stop and cut a passage where trees had fallen across the way. We drove for nine miles through woods without seeing any habitation, except two Indian huts.

'When we arrived at the banks of the river, near the mills we found that the ice had given way, so that the sleighs could not cross; and the miller's boat could not ply, because there was still a broad border of ice on each side of the river. We sent a man across to beg of our friend, Mr. —, who was settled there, to send his oxen and sleigh to a part of the river called the Little Lake, two miles lower down; and we determined to walk across. This delay was very embarrassing, but our travels were nearly at an end, and that gave us spirits to proceed with vigour through the snow, which came far above our ankles. The friends who came from the opposite side to meet us, carried the two youngest children; the workmen carried our bedding, and everything else was left at the mills. With this assistance we contrived to cross; and being soon packed into the sleigh, we proceeded, in the shades of evening, to our home, through nearly five miles of wood. Our loghouse was quite illuminated by the glare of the fires which had been prepared for us, and even if there had been no fire, we must have been warmed by the joy our friend showed at seeing us here.

'The house was not quite finished, and we found it rather cold at night; but every day since, we have made it more and more comfortable. Our books fill up one side of the parlour, and give it a comfortable look; and as it has two windows, one to the south, and one to the west, we have now the delightful warm sun shining in from ten till past five.

'This is really a pretty spot—even now, though the ground is covered with snow. The river is broad, and rushes by with great noise and rapidity, carrying down lumps of ice from the lake; it winds beautifully, and the banks are fringed with fine spreading cedars and lofty hemlock-pines.

'We have been most prosperous in everything—voyage,

journey, and health; and when I look back and think of all we have gone through since you and I parted, I cannot help feeling surprise, mixed with gratitude, to that merciful Being, who has watched over us and protected us all.'

16th.—I was talking to Mary after dinner, about the ant and the little puceron, and praising their mutual good feeling; but she said there were very few instances of such friendship among insects, and a great many of their hostility to each other. She mentioned the following fact, which will, I think, amuse Marianne.

The *perce-bois*, or wood-boring bee, an inhabitant of warm countries, and distinguished by her beautiful violet wings, is remarkable for boring long cylindrical cells in decayed trees, or even in window frames. She first bores obliquely into the wood with her strong mandibles, and then follows the direction of the fibres, forming a hole or tunnel of more than a foot in length, and half an inch in diameter. At the inner end of this pipe she deposits an egg, along with a sufficient store of honey and farina, for the support of her future offspring; and covering it with a thin partition, made of the particles of wood she had scooped out and cemented together with wax, she proceeds to deposit another egg and another supply of provision; and so on till the whole pipe is full. I must also tell you, that from the innermost cell she had previously bored a small channel to the outside of the wood, as a kind of back door, by which the young produced from the first laid eggs should escape in succession, each of them instinctively piercing the partition in the right direction. But now, Mamma, for my fact: there is a small species of beetle that watches the operations of the bee, and slyly deposits its egg also in the cell. If this egg should escape the vigilance of the poor bee, it is hatched into a larva before her own eggs, and, consuming all the food she had so industriously prepared, the right owner of the dwelling perishes.

The wood-boring bee reminded my uncle of the *teredo*, or ship-worm, which destroys the planks on ships' bottoms, by piercing them in all directions; and he told us that the ingenious Mr. Brunel had himself stated to a friend of his, that it was from the operations of this worm that he had borrowed the method which has been adopted in forming the tunnel under the Thames.

Mr. Brunel observed that the *teredo's* head is covered

with a strong armour, through a little hole in which it perforates the wood first in one direction and then in another, till the arched way is complete; when it daubs both roof and sides with a kind of varnish. In like manner Mr. B. conducts his operations in the tunnel; removing the ground in front, through the small apertures of a strong iron frame, which he calls the *shield*, in imitation of the teredo's armour; and then constructing a circular arch of brick-work, with strong cement, so as to resist the utmost pressure of the water. The shield is then moved forward nine inches (the length of a brick), a fresh ring of brick-work is built, and a fresh portion of ground is excavated.

This curious anecdote led to another of the same nature—an ingenious contrivance borrowed from a lobster's tail. On the other side of the Clyde, opposite the city of Glasgow, there was abundance of fine water, which it was desirable to convey across the river for the use of the inhabitants, but so as not to interfere with the shipping, and not to be contaminated with the salt water. Mr. Watt, the celebrated engineer, undertook to carry it in iron pipes fitted one into the other like the joints of a lobster's tail, so that when laid across the river they should adapt themselves to the form of the bottom. He perfectly succeeded; these flexible pipes have been in use for twenty years, and the inhabitants have been admirably supplied with this necessary of life, through that great man's happy power of observation.

17th.—My aunt has been very unwell for the last three days; she is now recovering, but still requires constant care. My cousins are most assiduous and tender nurses. They are attentive, without being officious, and they arrange the time of their attendance so as to permit each to have some leisure for her own daily occupations. This gratifies my aunt particularly; I have frequently heard her say, that it is a duty of those who attend on the sick to be as cheerful as possible, and that nothing contributes to cheerfulness so much as employment. She thinks it no proof whatever of real sensibility, to lay aside all one's usual pursuits be-
ground in friend or relation is ill; it only weakens the mind by with glances on the countenance that expression of anxiety from the tresses or alarms the patient.
fringed with it know exactly what my aunt's illness has been
'We have have been so much affected, that she has been

condemned for some time to total idleness, and hitherto she has not been permitted to listen to much reading or even conversation. I should have thought that a person who is so active in general, would have been doubly sensible of the weight of idle time. But her mind has such various stores of knowledge, deep and light, that she never can be in want of novelties to employ it; to-day I was allowed to stay with her for some time, and she repeated to me some beautiful moral reflections, as well as some lighter poetical compositions on which she had employed her mind last night. It is thus she beguiles the wakeful hours, and habituates herself to think more slightly of the sufferings which she sometimes endures.

WEEK 33.

Religious Reflections—Omnipotence—Rocks—Geological Collection—Coal Measures—Subterranean Botany—Lias—Ichthyosaurus—Layers of Shells—Good Friday—The Charm of Prophecies.

March 19th.—Sunday. My dear aunt is certainly much better. By her desire I was permitted to take care of her while the rest of the family went to church; and I was thus left sole guardian of this good patient, so precious to us all.

Immediately after they went away, she fell into a gentle slumber, and, as I had not provided myself with a book, and was fearful of disturbing her by walking to the book-case, I sat quietly near the bed, so that I could watch her. For want of other employment, I amused myself with comparing my former with my present life; and, though on the whole they are very different, there is one point, dear Mamma, in which they are perfectly similar—for the friends I am now with are, just like you, really and rationally religious. My reverie over, I repeated to myself some of our favourite sacred poetry, among which was Mrs. Barbauld's address to the Deity. I then tried to recollect the various religious books I had read since I came here; and afterwards I endeavoured to arrange the knowledge which I had acquired, not only from them, but from my uncle's conversations.

While I was engaged in these reflections, my aunt awoke, and, having taken her medicine, she desired me to read to her some of the Old and New Testament; and then, as she

insisted on it, I went out for a short time, leaving her maid in the room.

My mind, of course, dwelt on that good and amiable aunt, to whom I owe so much; and every turn I made in the garden brought me to some object that reminded me of the kind things she had said to me in our walks, and the many opportunities she had taken of giving my mind a right direction. Her religion is always cheerful, and she has the art of introducing little useful reflections into common conversation, so as to double the impression they make. Just where I was then sauntering, she had said to me, only a few hours before she was taken ill, 'You see that the embryo plant contained in this seed will not vegetate without heat and moisture—and so, my dear niece, our good dispositions, whatever they may be, will wither away without the continual help of Him who is ever ready to assist us, and to open our minds to the high views of a future state, which He has set before us; nor, Bertha, can it be considered one whit more wonderful that we should hereafter change into a life of immortality, than that the larva should burst into a beautiful butterfly, or that these little black seeds should expand into luxuriant foliage, and deck their branches with splendid flowers.'

The wind had been very high all that morning, and many broken branches were scattered about the shrubbery: my aunt seemed to delight in the 'wild music of the wind-swept grove;' and, as we sheltered ourselves from the blast, she pointed out to me the numbers of minute insects that were enjoying their short day of existence, unmindful of its terrors; and the birds that were struggling through it with materials for their nests; and the bees, who could scarcely withstand its power, yet were urged on, by their instinctive industry, to begin their winter's store. 'How that hoarse storm,' she exclaimed, 'and all these tokens of the opening spring, remind one of the Almighty power and benevolence!'

I quoted the well-known line—

Which Nature's works through all their parts proclaim.

'Well applied, Bertha. In every department of nature we find sufficient proofs of that omnipotence and goodness. The astonishing force of an unseen agent, like the wind, comes home indeed to the feelings at this moment, and leads one to reflect on its wonderful causes and its beneficial

effects ; but when we view, with the astronomer, the countless stars, and the regular movement of the planets in their orbits ; or, with the chemist, trace the infinite variety of matter up to the different proportions in which a few elementary substances are combined ; or if we examine the microscopic perfection of the commonest of these flowers ; or the young leaves already formed, and wrapped up for months in the buds ; or the beautiful preparation of hard scales and downy net-work, for the preservation of the young plant inclosed in the seeds,—the mind is absolutely lost in admiration.

I read His awful name emblazon'd high,
With golden letters, on the illumined sky :
Nor less the mystic characters I see,
Wrought in each flower, inscribed on every tree.
In every leaf that trembles in the breeze,
I hear the voice of God among the trees.

20th.—For some days past, the rooks have been very busy, building their nests. There are a few tall trees near this, which stand in a clump apart from the rest : Frederick says that the rooks have a fancy for them, and build there year after year. No creatures seem to be more attached to the place where they have lived ; nor can any be more sociable, as they generally place several nests together. But their sociable disposition does not imply honesty towards each other ; for, when a pair are constructing their nest, one always remains to guard it, while the other goes in search of materials, lest it might be pillaged by the neighbouring rooks. Frederick and I observed a transaction of this nature to-day ; and it caused a great uproar, for the crime is always punished by expelling the thieves from the society.

White, of Selborne, says, they depart on foraging excursions in the morning, and return in the evening ; and that, after the young have taken wing, there is a general desertion of the nest-trees ; but he says the families return in October, to repair their dwellings.

Among their favourite food is the grub of the chaffer-beetle, which, if allowed to multiply, would lay waste the corn-fields and meadows ;—and yet, how many mistaken people accuse these poor rooks of doing mischief !

Frederick contrived to get one of them to show me, that I might know how to distinguish them from other species

of the crow family. The rook is black, tail somewhat rounded, plumage glossy; the bill is more straight and slender, and its base is encircled by a naked white skin, which is scaly, and takes the place of those black projecting feathers or bristles, which, in the other species of crow, extend as far as the opening of the nostrils.

Rooks, I am told, are birds of passage in France, but in England they are stationary. In Siberia, they are the fore-runners of summer; and in France, they announce the approach of winter.

Now that they are busy building their nests, they make a noisy, hoarse cawing, which I have not yet persuaded myself to like; but it is agreeable to Mary and Caroline—I suppose, because it is united in their minds with the idea of spring.

21st.—After sitting a little time with my aunt, who, I am delighted to tell you, is much better, I had a botanising walk with Miss Perceval. What a very agreeable companion she is!

She told me that few countries, so limited in extent, comprise such a variety of plants as the British islands. Yet few of them are peculiar to these countries: those of our southern districts may be almost all found in France and Germany; those of Scotland are nearly common with the productions of Sweden and Denmark; and our elevated hills supply a vegetation similar to that of Norway and Lapland. The climate of Ireland varies so little from that of the corresponding parts of England and Scotland, that there is scarcely any difference in their native plants. She mentioned, however, two; the *menziesia polifolia*, or St. Patrick's heath, and the *saxifraga geum*, with its varieties, which are found wild in Ireland only. I reminded her of the arbutus, but she seemed to doubt that it is a native of Killarney, which surprised me, as you told me that it was; and my uncle expressed the same opinion lately. On the contrary, she is inclined to believe the tradition, that the Monks of Mucross Abbey introduced it there from Spain—for, she says, trees are seldom found, in a state of nature, confined to one spot only: and it is well known that the arbutus does not grow naturally in any other part of Ireland; it grows, however, abundantly, on all the shores of Spain, and from thence she thinks it may have been originally brought.

She gave me a very satisfactory reason why the native vegetable productions of Great Britain are inferior in number to those of countries on the continent; few seeds are furnished with the means of flying across the Channel, so as to have naturalized themselves here. Where no sea intervenes, they are gradually but continually spreading from one place to another. On the road-sides, and in the corn-fields of France, Germany, and Holland, we see many plants which have been imported for our gardens; even in the Flora Danica, there are many belonging to that small country, which are not possessed by us; and all the mountainous regions of Europe, though separated by a great distance, have several species in common, while we can boast of very few which are found in Great Britain only.

Miss P. told me, however, of some; for instance, the Isle of Man cabbage has not yet been observed in any other parts of the world than in that island, in the Hebrides, and on the north-western shores of England and Scotland. One of the most interesting of our British plants, she says, is pipewort; for, in no part of the continent of Europe is it, or any individual of this genus, to be found; and, what is very remarkable, though all the other species of the family are inhabitants of the tropics, yet ours is found in one of the most northern of the Hebrides, and in a lake which is peculiarly cold.

It is the same among the *cryptogamous* tribes, such as lichens, fungi, and mosses. Though we think Britain rich in that extensive class, most of them are known in other parts of Europe, or in North America; and she says it is a singular fact, that the lower we descend in the scale of vegetation, the more universally are the individuals of those tribes dispersed over the surface of the globe. In Carolina, for example, a large proportion of the *fungi* are the same with those of France and Germany, while, among what she calls the *phenogamous* plants, or those which have *visible flowers*, there are scarcely any that are common to Europe.

The *mosses*, too, which have been received from the higher parts of North America, and from Kamtschatka, are almost all indigenous in Europe.

22nd.—I had often wished to see the contents of a set of nice little drawers under the book-cases, on one side of the library; at last, to my great satisfaction, I have been allowed to examine the small geological collection which

they contain. It consists of specimens of the different *series* of rocks, accompanied by the organic remains which distinguish them.

My uncle first showed us some bits of hornblende, primary limestone, mica-slate, and granite, as specimens of the inferior order, or ancient primitive rocks, destitute of all organic remains, and having something of a crystalline appearance.

Next he showed us the drawers containing the transition or submedial series, including greywacke, transition limestone, quartz, common slate, and serpentine; they contain some specimens of the fossil scales of organized beings, such as *zoo*. My uncle showed us a few specimens of these, and also of some shells, which, he says, are peculiar to *fresh water*, but which are often found in alternate layers with *marine* shells, as if they had been deposited by alternate *situations* of fresh and salt water. And lastly, he showed *measures* of the shells found in a horizontal *stratum* of them of animals, *rocks* of Essex and Suffolk have any resemblance to existing *rocks* which are exact of the limestone or marble specimens *we* see in the *stone* on one side, so as to show their beautiful veins *etc.*, he *says*. On several bits of the coal and black slate, I saw the impression of leaves, branches, and seeds, but no shells, or any kind of animal remains; there was one perfect fern leaf, but, my uncle says, of an unknown family, and a great many reeds. There was also a flat block of greyish freestone, on which the regular scales of some seed-vessel, like a very large fir cone, were deeply marked; and on another I am sure I could distinctly trace the imbricated form and the spines of the common prickly pear of the Brazils. Indeed, my uncle thinks that all these vegetable remains seem nearly allied to the plants of tropical climates; and he says, it would be a most interesting employment for some naturalist to devote himself to the study of what might be called *subterranean botany*. These coal measures occupy several drawers; for, besides the Staffordshire, Newcastle, and other coals, he has specimens of the seventeen coal beds of the forest of Dean, and a large collection of the organic remains, which he has taken great pains in *arranging*.

The next drawers contain the supermedial series, beginning with the magnesian limestone, new red sandstone and red marl. There are very large districts of this *formation*

tion in the central parts of England, and they include the great deposits of rock-salt, which is of so much importance, he says, to the empire. Considerable beds of gypsum are also found; but it contains no organic remains of either animals or vegetables. Above these,—for you no doubt have perceived, what I forgot to mention, that my uncle began at his lowest drawer, in order to show the lowest strata first—above these, he showed me a collection of the lias and oolite strata, both of them impure limestones, but extremely rich in the number and variety of organic remains. These consist of ferns and flags, corals and zoophytes, shells of all kinds, ~~and~~ ^{which} ~~have~~ ^{have} repeatedly drawn, ammonites ~~not~~. But, as if to prevent the possibility of doubt of other subject, St. Paul emphatically tells the Hebrews, that ~~of~~ ^{the} High Priest entering into the Holy of Holies with the annual sin-offering was only “a figure for the time ~~being~~ ^{being} ~~the~~ ^{the} ~~present~~ ^{present}.” And he distinctly adds, that Christ, not ~~“~~ [“] ~~he~~ ^{he} has only a ~~small~~ ^{small} ~~ones~~ ^{ones}, but by his own blood, ~~his~~ ^{his} book-case; but, he says, some ~~have~~ ^{have} ~~seen~~ ^{seen} ~~the~~ ^{the} lias near Lyme, in Dorsetshire, three or four ~~feet~~ ^{feet} ~~intimate~~ ^{intimate}. And he told me that at Stonesfield, near Woodstock, Oxfordshire, the fossil remains of another extraordinary ~~animal~~ ^{animal} of the amphibious tribes was discovered, which has been called the monitor; no complete skeleton of it has yet been put together, but many of the detached parts must have belonged to an animal forty feet long, and twelve feet high!

The remainder of this numerous series consists of different strata of sands and clays, and various limestones, up to the chalk formation; and they contain a repetition of the fossils he showed me in the lower parts of it. He frequently made me observe, that these fossils are all not only very widely distinguished from the families found in the carboniferous and transition series, but that there are also striking peculiarities in themselves, according to the bed which they occupy.

We came next to the great chalk formation, with its wonderful deposition of flints in parallel layers; and then to the last, or superior order, consisting of gravel or sand, or of clay, which is, in some places, four or five hundred feet thick, and resting on the chalk. Its organic remains are highly interesting; but my uncle said he would not perplex our memories at present, by a minute examination of the specimens in his collection; he wished to give us

general ideas; hereafter we may study the particulars. Before he closed his drawers, he showed us, that below this upper formation all the remains of organic bodies were in a petrified or mineralized state; that is, the general structure and external form of the body has been preserved, but the original matter of which it was composed has entirely disappeared, and has been replaced by the substance of the mineral in which it was imbedded. On the contrary, in the strata which cover the chalk, the shells are merely preserved, and in such a state, that when the clay or sand in which they lie is washed off, they might appear quite recent, if they had not lost their colour and become more brittle. My uncle showed us a few specimens of ~~some~~ ^{also} some shells, which, he says, are peculiar to *fresh* water, but which are often found in alternate layers with the *marine* shells, as if they had been deposited by alternate inundations of fresh and salt water. And lastly, he showed us some of the shells found in a horizontal stratum of gravel on the coasts of Essex and Suffolk, about fifty feet above the sea, which are exactly the same with the shells at present existing in the sea on the same coast. Above all these regular strata, he says, there is in many places spread a confused covering of gravel, apparently formed by the action of a deluge, which had shattered and rounded the fragments of the rocks over which its torrents had swept.

In this gravel the remains of numerous land quadrupeds are found; many of them of species now unknown, such as the mastodon, and mammoth or fossil elephant, with varieties of the hyæna, bear, rhinoceros, and elk, but indiscriminately mingled with others which still exist in the country.

I have taken a good deal of pains to acquire a clear idea of this order of the strata, with their vegetable and animal remains. My uncle did not show them all at one time; we went over them by degrees, a little every day; but I have just summed them up altogether, to give you an idea of what I have seen.

24th, Good Friday.—Before we went to church to-day, my uncle spoke to us for a short time on the solemn event we were going to commemorate; and though my notes of what he said can be of little use to you, yet I am anxious to show my dear Mamma that I take still more pains to profit by what he tells us on this most important subject, than upon geology or anything else.

iculars. Being too well acquainted with Scripture," said he, "I know that the lesson which it everywhere inculcates is, that man by sin and disobedience had fallen under the curse of his Maker, and that there was an invincible barrier, however inexplicable to our comprehension, that no man should lay down his life to redeem us from that bondage, and to procure for repentant sinners forgiveness and reconciliation."

But, as if to prevent the possibility of doubt on the subject, St. Paul emphatically tells the Hebrews, that the High Priest entering into the Holy of Holies with the annual sin-offering was only "a figure for the time then present." And he distinctly adds, that Christ, not "by the blood of goats and calves, but by his own blood, obtained eternal redemption for us."

The promise made to our first parents intimated a future deliverer, who should remove those evils which had been entailed on mankind by their misconduct. This was the assurance that became to the Israelites the grand object of their faith; and it was to perpetuate this fundamental article of their hope and belief, that a standing memorial both of the fall and of the promised deliverance was appointed. Now, what memorial could be more apposite than that of *animal sacrifice*? It connected in one view the two great events in the moral history of man,—the Fall, and the Recovery; the death denounced against sin, and the death appointed for that Holy Intercessor whose blood was to be accepted as a final atonement.

How true it is, that the ways and thoughts of God are not like those of men!

Wonderful in every part of it, but chiefly in the last acts of it, was the awful scene of this stupendous expiation. That the author of life should himself be made subject to death—that his sufferings and humiliation should be the manifestation of his glory—that by stooping to death he should conquer death;—and that the height of human malice should but accomplish the purposes of God's mercy!

If you compare the whole chain of prophecies with the history of our Lord's sufferings, you will find that it was

one of those striking points of connexion between natural and revealed religion which must make a deep impression on every reflecting mind; and she agreed with me, that nothing could afford a better subject for a hymn.

WEEK 31.

Easter Day—Irresistible Evidence—Value of Geology—Level of the Ocean—Canada Extracts—Greenhouse Plants in a Pond—Yellow Ants and Aphids.

March 26th.—Easter Day. As soon as breakfast was over, my uncle said he was going to address a few words to us on the great Christian festival which we were about to celebrate.

‘It is most satisfactory,’ said he, ‘to know that whether we consider the number, the means of information, or the veracity of the witnesses, no testimony can surpass that which was borne by the Apostles to the fact of our Lord’s resurrection.’

‘That wonderful event was the accomplishment both of the ancient prophecies, and of his own predictions; it was a miraculous declaration on the part of God, that the great atonement was accepted; it was the Divine attestation to the truth of our Saviour’s doctrines; a full confirmation of the promises he had already held out to his followers, and consequently a perfect security to them for the ultimate completion of those further promises which it had been one great object of his mission to offer to mankind. We have reason, therefore, to be thankful that, in the first preaching of the Gospel, Providence ordained that a fact of such importance should be accompanied with irresistible evidence; evidence of such a nature as requires no nice examination to adjust, but such as imparts conviction to every one who can read the Bible.’

‘The Jews were disappointed that Jesus did not show his power by coming down from the cross; but he showed his power more fully by rising from the grave. They saw him taken dead from that cross, and laid in a sepulch which was scooped out of the rock, which was accessible only at the entrance, and which was guarded by six soldiers. Yet while the soldiers watched, he burst through feeble barriers, and rose from his tomb, to show his

lowers that those who die in Him shall rise, as he did, to triumph over death.

'After his resurrection,' continued my uncle, 'there was a wonderful change in our Lord. Previously to this event, it was in power, and in wisdom, that he had showed himself divine; but afterwards, everything concerning him seems miraculous and mysterious. This first appears in the manner of his resurrection. He evidently had left the sepulchre before it was opened; the women who are named by St. Matthew saw the angel appear and roll away the stone; but he was already gone. "To Mary Magdalene," he said, "touch me not," as if there was that divine spirituality about his person which forbade the near approach of human frailty. And twice, when his disciples were assembled, and the doors fastened, for fear of the Jews, he appeared in the midst of them; but to Him who had departed from the unopened sepulchre, it was no difficulty to enter a barricadoed house. From these, and other concurring circumstances, it is evident that his body had undergone a change, "the corruptible had put on incorruption;" it was no longer the human body in its mortal state—it was the body raised to life and immortality, and united to the Deity.

'There was something about this divinity of his person that was probably unsuitable to a more open display of himself to the public than he vouchsafed to make. He showed himself, however, to all the Apostles; "he was seen of about five hundred brethren at once;" in short, there were sufficient witnesses to attest his identity, and to publish the truth of his miraculous resurrection to all mankind. The Jewish people, in the rejection of our Lord, had filled the measure of their guilt; they had no further claim on him, and he no longer held his visible residence among them. When led to the cross, he had warned them that they would see him no more till they should be prepared to acknowledge his authority.

'The resurrection of our Saviour ensures resurrection to us also; it insures to us a second life; but the complexion of that life depends on our faith, and our obedience in this. He "will change our vile body, that it may be fashioned like unto his glorious body;" but this transformation of our being requires a previous transformation of our mind.

'It is true that, as nothing has been distinctly communicated to us on the mode of existence after our resurrection,

we can know but little of the precise nature of that future life ; but there may be more analogy in it to our present state than we can now venture to affirm. There is some reason to believe that the employments of the good and wise, and the chief sources of their happiness in this world, have more or less relation to those which they are to enjoy in the world to come. The study of nature, the pursuit of knowledge, and the exercise of our faculties, when controlled by religion and virtue, may all, perhaps, assist in qualifying us for occupations and enjoyments in the "kingdom of the Father," infinitely more excellent and refined indeed, yet not entirely dissimilar.

'But whatever view we take of the mode of our future existence, it must revive and invigorate our minds to feel that the evidence of the resurrection of mankind is full and complete ; and that we may, therefore, look forward with perfect confidence, beyond these clouded scenes of mortality to their final result. Let us now go, my children, and during the solemn service of this day, let us turn our eyes forward to that permanent happiness that we are taught to expect—and humbled by the discipline and vicissitudes experienced in the present life—now, and always, let us keep our minds steadily and gratefully fixed on that glorious consummation of immortality which our Lord has purchased for us by his death and resurrection.'

27th.—A new world of knowledge has opened to me, dear Mamma, since my uncle began to teach us a little geology. I know it is but an outline, the slightest sketch, as he says, of the science ; but it is sufficient to give a general idea of the strata near the surface of the globe ; and the specimens of the different series have made all he told us doubly impressive. He has no beautiful minerals and crystals, as they are very expensive, and not so instructive as his rock collection. Indeed, he considers his children in all that he does ; and these drawers were, I believe, arranged purposely for their benefit.

He showed us this morning another class of substance imbedded in the secondary strata ; these are the pebbles & broken fragments of rocks which they are often found to contain, and which have evidently belonged to strata older than themselves. For instance, new red sand-stone frequently contains pieces of the carboniferous limestone belonging to the order next below it, as well as of many sti

older rocks : it is, in fact, nothing but a mass of sand and gravel cemented together ; and which sand and gravel are only the remains, or *debris* as they are called, of former rocks. My uncle says we may conclude, from this fact, that the rocks from which those fragments were derived must have been exposed to the action of violently agitated water, which tore off these masses, and rounded them by friction, before the newer rock, in which the fragments are now imbedded, was formed.—Another conclusion he draws from it is this : these rocks were undoubtedly, at some former period, beds of loose gravel ; but loose gravel could never have been left by the water piled up in a highly inclined slope : we may therefore be sure, when new sandstone and other rocks of the same kind are found in nearly vertical strata, that this cannot have been their original situation, but that they must have been forced into their present position by some convulsion *after* their consolidation. These consolidated gravel beds are called conglomerates, breccias, or pudding-stones, according to the materials of which they are composed.

He told us that the remains of marine animals, such as we saw the other day, are found in two-thirds of the rocks that compose the surface of the globe ; and even on the highest summits of the Pyrenean mountains in Europe, and of the Andes in America. From this important fact, it is ascertained, without the possibility of doubt, that those continents have not only been covered by the ocean, but that they are formed of materials which once gradually collected at the bottom of that ocean.

A long conversation followed, but I cannot trust myself to write it ; it principally turned on the wonderful changes that have taken place in the level of the ocean. What extraordinary causes could have lowered it to its present level, or else have raised up the land out of its bosom ?—If the land has really subsided, what can have become of the enormous quantity of water which once flowed round the tops of the loftiest mountains ? These questions, he said, have long engaged the attention of philosophers, and many ingenious theories and fanciful suppositions have been advanced to solve them. He slightly mentioned some of them ; but merely to gratify our curiosity, strongly advising us to repress our anxiety about causes till we were in possession of facts.

28th. — CANADA EXTRACTS.

'Loghouse, April 5th.—You can scarcely conceive, when I saw your handwriting, the thrill of delight it gave me—your letter was a real feast—I could not sleep that night, from the fulness of my head and heart.

* * * * *

'The snow, I am told, continues later this year than usual; in some places it was three feet deep, and is still deep, though it has gone off rapidly within the last fortnight, as it thaws a little every day, while the sun is hot.

'The buds are all swelling, and I have heard one or two new birds of late—but they stay up in the high trees, and I have not been able to see them. We have numbers of dear little tomtits, and some sparrows and crows. I used to despise all these at home, but here I delight in them—they are like old acquaintances. When we first came here, I heard an eagle very often, but he has deserted us.

'I am surprised at the nice green herbage that is under the snow; by which, and the decayed leaves, it has been preserved from the frost. The children bring in plants every day; the mosses and lichens are all quite new to me.

'The deep snow has much delayed the clearing of our land; next week we are to have five men here to cut down trees—*choppers*, as they are called; we have one at present, and it is astonishing with what dexterity and speed he fells these huge hemlock pines, nearly one hundred feet high. It is almost sublime to see them stoop their dark heads slowly, and then fall; very gradually at first, but soon increasing in rapidity—tearing off the neighbouring branches, shaking all the other trees, and coming down with a crash that makes the whole forest echo the sound. The Americans from the United States are employed to *chop*, as they are more expert than people from the old country, and can make the trees take the precise direction they choose in falling.

'We are much better off than most people are on first settling in the woods. There are some families here, who for the first six months had no food of any kind, except sa pork, for breakfast, dinner, and supper, and without even bread; but we have good bread and peas, and sometimes turnips, with excellent milk. We brought barley and rice with us; and the arrow-root that you gave me is

great comfort to the children;—I never saw three more healthy creatures.

* * * *

' *May 2nd.*—Last week we were busily engaged in burning the fallen trees, which covered the surface of the ground that we had cleared.

' The branches were first piled up and burned; then the great stems, which had been cut into pieces about twelve feet long, were drawn together by the oxen, and with much labour raised into piles, and set on fire. This was a very dangerous operation, for some of them were very near our wooden house; and the whole surface of the ground is combustible, as for several inches deep it is composed of leaves and bark, and looks like a bed of peat earth. When this takes fire, the flames rapidly spread, and are very difficult to extinguish; but we are now safe.

' The Indians sometimes walk into our house; but they are harmless and inoffensive, and ask only for whiskey, which they like better than anything else. They bring baskets, and little bowls, and dishes, made of the bark of the birch-tree, and are glad to sell them for spirits, flour, or pork. They come down the river in their canoes, and can paddle them across the rapids just opposite this house, where no European could venture in a boat.

* * * *

' *June 5th.*—Our first spring flowers were hepaticas, which actually carpeted the ground, as daisies do at home: they were single, but very large, and blue, pink, and white. We had the pretty yellow dog-tooth violets in profusion; then white and crimson lilies, both of them handsome, but with an odious smell: there was another very elegant-looking plant, with a leaf like fumitory, the root a collection of reddish bulbs, and the flower something like a butterfly orchis.

* * * *

' We have now abundance of yellow, white, and purple violets, but the white only have a sweet smell. There is also a beautiful yellow lady's slipper, and numerous other flowers, which I may describe some other time.

' Our shrubs are leatherwood, cranberry, dogwood, Alpine honeysuckle without scent, and syringa. The trees are elm, maple, oak, beech, cedar, hemlock pine, hickory, and lime. The oak grows tall and straight; but all the trees grow

tall and straight in these forests. I spend what time I can spare in examining the trees and plants that are new to me; I wish my botanical friend Miss Perceval was here to assist me.—We have a great deal of the moss, or rather the *tilandsia*, about which you inquire; it hangs from almost every tree, and we saw it in quantities along the banks of the St. Lawrence, before we reached Quebec. The captain of our vessel told us it was used in the States to stuff beds; and that he had carried some home to his wife for the same purpose.

* * * * *

'*July 1st.*—I must give you a sketch of the manner in which we pass our time. Mr. * * * goes out at five, and returns to breakfast at seven; he then works at his farm till twelve, when dinner is ready; after which he rests some time, and again works till eight, when I summon him to coffee. Household cares and preparations occupy me all the morning, and teaching the children, and working for them, the rest of the day. After they go to bed I have a nice hour for writing or reading.

'It is the custom for the ladies in this country to dress in the morning very plainly, and suited to the hard work in which we must all take a part; after dinner they put on silk gowns and smart caps, and either go out to pay visits, or stay at home to receive them. But we live in such perfect solitude in these woods, that we have no neighbours to go to, or to expect here. We are going on as yet with smiling prospects, and doing something every day that tends to our comfort; but we must be contented to advance very slowly.

'In spite of every effort, my thoughts too often turn to dear *home* and to former times, or sometimes they take a far stretch forward; but these are only airy visions, which I do not encourage. Yet I cannot help praying that we may be permitted to meet again in a few years. I fear setting my heart too much on this, but I trust to the support of Providence under every disappointment, and under every trial. Trials we must have in all places, still more in these dreary woods.'

29th.—I heard lately that several of those greenhouse plants which are natives of swamps, if planted in a pond the bottom of which never freezes, would grow as well as in

in their own country : I have therefore asked permission to try this experiment, and my aunt let me have a plant of the long-leaved *amaryllis*, and one of the Ethiopian *calla*. We broke the pots they were in, that the roots might not be disturbed, and then put them into small open baskets, with a fresh compost round them. My uncle had places made in the bottom of the pond, which is about two feet deep, and the baskets were plunged into them, and the soil at the bottom drawn close round.

The gardener thinks the salt dross has been effectual in destroying the wire-worm in my carnation beds ; so last week he added a small quantity of sharp sand, and then the beds were dug, and raked nicely for planting. Yesterday and this morning I have been busy planting out my layers ; and as I stirred the ground with my scoop trowel, I could perceive no traces of my old enemies.

A few weeks ago I raked off half the layer of peat earth, with which I had covered my *ixia*, *gladiolus*, and *oxalis* beds, to preserve them from the frosts ; I have now raked off the other half, and the beds being carefully forked up, I hope, in May, to have some nice flowers there.

This is a most busy time in the garden, forking and dressing the borders, mending the edgings, earthing-up peas and beans—continually watching and defending the blossoms of the wall-fruit, pruning trees, preparing hot-beds, and sowing cauliflower, lettuce, onion, brocoli, radishes, &c. &c. ; and, in *our* garden, planting out flowers and removing offsets, dressing and protecting the beds of spring flowers that are going to blossom, and sowing sundry annuals. In short, everything is alive, and everybody anxious not to lose a moment while the weather is so favourable.

30th.—I have been reading all the accounts I could find of ants ; and am surprised to find how many curious circumstances there are in the history of some of the species of this country and of France.

Frederick knew where there was an ant-hill, and took me there, when they began to revive, on a sunny day a few weeks since. We observed numbers coming out of the ground, as if roused by the warmth, and assembling in crowds on the top of their nest ; they were in continual motion, walking over it, and even over one another, and yet without quitting the spot. This lasted for a few days, and

then they began to repair the upper stories of their dwelling, which had been spoiled by rain and snow. We frequently watch them, and they appear to be incessantly engaged at this work till it is quite dark.

They certainly give us an example of perseverance; but their foresight in laying up a store of grain for winter is now considered to be an unfounded idea; for they are nearly torpid during the winter, and do not require provisions. May it not be said, however, that they show forethought and contrivance in regard to their friends, the aphides, which I mentioned some time ago in my journal?

The yellow ant, for instance, which seldom leaves its home, and likes to have its comforts within reach, usually collects in its nest a large *herd* of a kind of aphis that derives its nutriment from the roots of grass. These are conveyed by subterranean galleries into the nest, so that, without going out, it has a constant supply of food. The ants bestow as much care on these little milch-cows as on their own offspring, and pay particular attention to their eggs, moistening them with their tongue, carrying them tenderly in their mouth, and placing them in the sun to be hatched. When Frederick opened one of the ant-hills, we observed a parcel of these little black eggs very near the surface; and the ants were so distressed at our visit, that they immediately began to carry the eggs to the inside of the nest. By hatching these eggs early they provide future food for their own families; and I am sure that is showing forethought. This aphis yields a great quantity of that sweet fluid of which the ants are so fond; it flows from two hair-like tubes, placed one on each side, and the ants, who watch for the moment when it is ready, suck it down immediately. It is said, that the ants can make the aphides yield this fluid at any time by patting them with their antennæ; and when they have milked one of their little cows, they go to another.

As to all the varieties of the tropical ants, the inhabitants of South America know but too much of them already; but I must tell you of a use to which, in another country, the nests have been applied, and which you could scarcely have guessed. In the southern part of Africa, they raise *sol* nests of clay, in shape like a baker's oven. The Caffre when first permitted to settle at Gnadenthal, one of the Moravian settlements, converted these tumuli into over

Having expelled the inhabitants by smoke, they scooped them out hollow, leaving a crust of a few inches in thickness; and then used them for baking their loaves. The clay of which these nests are formed is so well prepared by those industrious animals, that it is used for floors of rooms by the Hottentots, and even by the Dutch farmers.

April 1st.—The little buds of pear-blossoms, which I told you had enlarged so much, have this day blown out completely. They are, I do think, a curiosity. They have been now about two months in water, but they had lain dry so long before, that one might have thought no life remained in them. The horse-chesnut leaves, which first came out, begin to droop; but on one of the twigs there is a nice young shoot, at least two inches long, which looks bright and fresh.

The lilac buds, I am sorry to say, have withered; but some of the ash leaves have opened out finely: three of them, however, were curiously twisted, and filled up with a cottony substance, which, on examination, was found to contain a little greenish insect. Mary thinks it is the *aphis fraxina*. What a long time the eggs must have remained there, for I do not think an *aphis* could have found out this branch in my room

WEEK 35.

Exhortation of Moses—Hymn—Trap Formation—Specimens—Vegetation changes with the Situation—*Rafflesia*—Forests of New Holland—Power of the Horse and Lion—The Currents of the Deluge—The Chibouque—Its Ornaments.

April 2nd.—Sunday. Deuteronomy, the title of the fifth book of the Pentateuch, is derived, I find, from two Greek words, which signify the second law, or rather the repetition of the law. Mishnah, the name the Jews give it, has nearly the same meaning. 'Moses, in this book,' said my uncle, 'not only recapitulates the laws he had already ordained, but makes several explanatory additions, and enforces the whole by the most earnest and impressive appeals to the gratitude, the hopes, and the fears of the people. To them it is principally addressed, as most of what particularly related to the priests is omitted; and as it was drawn up in the last year of their abode in the wil-

derness, we may suppose that it was intended as a compendium for the benefit of the new generation, who had not been present at the first promulgation of the law.

‘It is remarkable that, in the preceding books, Moses speaks of himself in the third person; but in Deuteronomy he drops the assumed character of an historian, and addresses himself to the nation in the animated language of a prophet, and with the authority of their chieftain and law-giver. He begins by reminding them of the many circumstances, since their departure from Horeb, in which they had experienced the Divine favour; and then contrasts the success and the victories that had marked their progress with the disobedience and ingratitude that had provoked the Divine wrath. He frequently alludes to his own guilty conduct, and to the inexorable decree by which he was debarred from accompanying them to that land of promise for which he had so zealously toiled. He dwells on every circumstance that could improve their hearts, and earnestly enjoins the succeeding judges of Israel to do strict justice, and to inculcate the principles of obedience and piety. He rehearses the commandments which he had delivered to the people direct from God, and exhorts them by every possible argument to fulfil the terms of that covenant which the Lord had made with them. While he affectionately urges their future obedience, and severely reproaches their past misconduct, he loses no opportunity of unfolding the glorious attributes of Jehovah, and dwells on His mercy and compassion, and on His promised blessings. He then enters into a new covenant with the people, which includes that previously made at Horeb, and ratifies all the assurances long before given to Abraham and his descendants.

‘The historical part of Deuteronomy contains a period of only two months; and concludes the life of Moses, that truly great man and faithful servant of the Most High. His parting words to the people whom he had so long and so anxiously governed, were expressed in a hymn that is pre-eminent for the beauty and strength of its composition. It briefly but pathetically reiterates his warning exhortations, and ends with a repetition of the particular blessings promised to each tribe. His race being now run, we are told by the writer who finished this book, that Moses retired to the top of Mount Nebo, from whence he was permitted to

behold the land which the Lord had declared the seed of Abraham should inherit; and he there died in the 120th year of his age, and in the year 2552 of the world.'

The coming of Messiah is more explicitly foretold in Deuteronomy, my uncle says, than in any other book of the Pentateuch; and the prophecies of that great event, as well as of many other circumstances in the history of the Jews, have been so fully and minutely realized, that they completely demonstrate the Divine inspiration of Moses.

3rd.—Besides the rocks which compose our five grand formations, there is another series, the *trap* formation, or *overlying* rocks; so called, because they are found in various places, lying on almost every rock, from granite even to chalk. They sometimes traverse the other rocks in *veins* or *dykes*, and are sometimes found in immense shapeless masses, but never regularly stratified. It is evident, from these facts, my uncle says, that their origin must be more recent than those rocks on which they repose; yet they are quite free from all organic remains—none, either animal or vegetable, having yet been found in any rock of this class in England, nor, he believes, in any part of the world.

These circumstances have given rise to much discussion, as to the original formation of these trap-rocks, whether by fire or by water; but that is a subject on which my uncle will not yet allow us to touch. Some species of this family have the appearance of crystallization; greenstone trap, for instance, has large distinct crystals of felspar; in others, every trace of distinct crystals vanishes, and the whole assumes a dull earthy appearance.

The famous basaltic rocks, of which there are such singular specimens in Scotland and Ireland, belong to this family; but I shall be able to tell you much more about them in a few months, my dear Mamma, for my uncle says it will be necessary for him to visit Ireland, and he proposes to take us all with him, to see the Giants' Causeway. You will be surprised at this, but pray do not be alarmed; I assure you there is no danger now from the wild Irish. My uncle has been there already, and, from what he says, I think some parts of that country must be very interesting. I am so full of the idea of our Irish travels, that I can write no more to-day.

5th.—I have had another long walk to-day with Miss Perceval, and, therefore, another charming conversation.

The infinite variety in the vegetable kingdom was our chief subject.

'Plants,' she said, 'have not been thrown at random over the surface of the globe; in every region we find those which are best adapted to each particular situation. Every climate, and every soil, has some peculiarity which influences its plants; and every plant seems to be subservient to some great and important object. From the brilliant profusion of vegetation in some countries, down to the stunted lichens which just colour the rocks in others, every change points out the beneficence of the Creator; and those who endeavour to comprehend this beautiful order, and who trace these arrangements to the general system of Providence, can alone enjoy the study of botany in its full extent.'

She then told me a great deal about this distribution of plants, and mentioned many of the circumstances which appear either to fit them for the different regions of the earth, or to render them useful in supplying the local wants of the inhabitants. She began with the low plants whose small, close-set leaves resist the intense cold of high latitudes, or of stormy mountains; and, tracing the gradual increase in the size, as well as in the number of native plants, through all the intermediate climates, she ended with the great stems, gigantic leaves, and splendid flowers of the torrid zone.

'A similar change,' she added, 'may be observed in those adjective races of plants which depend upon others for support and protection. Instead of the dwarf mosses and lichens which clothe the bark of trees in colder countries, the luxuriant parasites between the tropics may be almost said to animate their trunks. Delicate flowers spring from the roots of the chocolate and calabash trees; and, amidst the abundance of flowers and fruits, and the confusion of parasites and climbing plants, the traveller is at a loss to determine to what stem the leaves and blossoms belong. Humboldt describes a species of *aristolochia* whose flowers are four feet in circumference; but Sir Stamford Raffles discovered a flower belonging to a parasite plant in the island of Sumatra, that was nearly ten feet in circumference. He brought home an exact model of it, which now in the apartments of the Horticultural Society, a which your uncle told me he saw and measured when was last in London. It has five petals of a deep red

lour, and of a very solid fleshy substance, from a quarter of an inch in thickness at their outer lip, to almost an inch at their base; and he understood that, when the flower was first cut, it weighed fifteen pounds. The nectarium is so large and deep, that he thinks it would hold eight pints of water; and the whole diameter of this giant flower he found three feet and two inches.'

I interrupted her, to ask the name of this wonderful plant.

'It has been justly called, after its lamented discoverer, the *Rafflesia*. A model was an excellent method of making us acquainted with its appearance; for the northern nations can have but a faint idea of the majestic forms of tropical vegetation from mere drawings and descriptions; and still less can they judge of them from the sickly plants in our stoves and greenhouses.'

This is just what I have myself thought a hundred times, Mamma. I then asked her about the *Cactus* tribe, of which we have so many singular-looking species in Brazil.

'It is, indeed,' she replied, 'a most grotesque family; some with their round backs and spines, resembling a hedgehog, while others appear like the pipes of an organ rising into long channeled columns. They are almost entirely confined to the New World, one species only being a native of the south of Europe. This is the *C. opuntia*, or prickly pear, which bears on the edge of its leaf an agreeably flavoured fruit. The *melo-cactus* has been named by St. Pierre the Vegetable Spring of the Desert; its shape is spherical, and though half concealed in the sand of the parched plains in South America, the animals, which are always tormented by thirst, discover it at a great distance, and, notwithstanding its formidable prickles, greedily suck the refreshing juice with which it abounds.'

From the rich vegetation of America we went to New Holland, and she told me that though but little of the interior has been yet explored, numbers of vegetables, totally different from those of America, though in the same degrees of latitude, have been found there. 'They seem to have quite a separate character; and those that are suited to the nourishment of man are as rare in that country as they are common in America. The forests of New Holland, where the axe has never been heard, and where vegetation extends itself without restraint, are described as having a very sin-

gular appearance; the trees crumbling with age, and covered with mosses and lichens.—Among their most beautiful productions are the *mimosæ*, the superb *metrosideros*, and the whole tribe of *eucalyptus*; many of which are from one hundred and sixty feet to one hundred and eighty feet in height.'

I asked Miss Perceval whether South America or India had the greatest number of plants. 'India, I believe,' said she; 'its inhabitants have been so long in some degree civilized, that, in addition to its native vegetation, many plants must have been naturalized, and many varieties produced by culture; and India exclusively boasts of the perfume of the most precious spices.'

'But there is another part of the world which we must not forget,' continued Miss Perceval, 'where nature seems to delight in multiplying the species belonging to each genus. I allude to the Cape of Good Hope, where the silvery lustre of the innumerable families of the *proteaceæ* gives to the woods an appearance quite unlike those of either Europe or America. The heaths are almost infinite in variety; the geraniums are scarcely less so; and the gladiolus, the ixia, and the whole order of *irideæ*, decorate the fields and thickets of the Cape with an exuberance unknown in any other country.'

'To form a just view of vegetable nature, we must observe it in those countries where the ground has not been turned by the hand of man. Few such spots are now to be found in Europe, except on the summits of the Alps and Pyrenees. There, mountains piled on mountains, rising above the clouds, form so many gardens, furnished with a vegetation of their own, and the character of which changes with the temperature at each degree of elevation. The same gradation takes place on all other lofty mountains; and in Frazer's account of the Himālā chain, which separates Thibet from India, there is a long list of English plants that he found there at the altitude which corresponds with our temperate climate; such as horse-chesnut, birch, and apricot, strawford R raspberries, lily of the valley, and many others; in the higher up, he even saw the famous Iceland lichen. Yesterday Mr. Lumley and Mr. Maude dined now in d, in conversing about the new books which Mr. which you^s just brought from London, he spoke very highly was last in Malcolm's 'Sketches of Persia.' He mentioned

several interesting anecdotes which he found there ; and to entertain Wentworth, he related some of the exploits of Roostem and his wonderful horse Reksh ; of which you shall have the following as a specimen.

‘ All countries have their fabulous heroes, and Persia had her Hercules in the renowned Roostem. He undertook the deliverance of his sovereign, who was a prisoner in Hyrcania, and set out alone on his good horse Reksh. Fatigued by his first day’s journey, he lay down to sleep, having turned his horse into a neighbouring meadow. There Reksh was attacked by a furious lion ; but after a short contest, he struck his antagonist to the ground with a blow from his fore-hoof, and completed the victory by seizing the lion’s throat with his teeth. When Roostem awoke, he was more enraged than surprised that Reksh, unaided, should have risked such an encounter. “ Hadst thou been slain,” said he, “ how should I have accomplished my enterprise ? ” ’

This story produced a grand discussion.—Some doubted the power of the horse to strike such a creature as a lion to the earth. Wentworth quoted different books of travels to prove that horses always trembled with instinctive dread at the sight of a lion ; and even Mr. Maude, highly as he estimated the courage of a horse, did not seem to think him capable of such a noble effort. I thought to myself that it was perfectly suited to the other fabulous adventures of Roostem.

My uncle waited to hear everybody’s opinion, and then said, ‘ I will tell you a singular circumstance which an old friend of mine witnessed, when he was at the King of Sardinia’s court, at Turin, about forty years ago. Perhaps it may convince some of my young sceptics, not of the truth of Roostem’s exploits, but at least of the strength and spirit of horses. The king had a remarkably fine charger, but so untameably vicious, that, after having killed two grooms, he was ordered by his majesty to be shot. It was suggested, however, that as he was to die, it would be a good opportunity of putting to the test the bravery and vigour of a horse whose spirits had not been subdued by being domesticated ; and the king readily consented that he should be turned loose into a well-secured arena, along with a ferocious lion that belonged to the royal menagerie. Arrangements were soon made ; and both these animals were allowed to enter at the same moment through opposite doors.

They approached a few steps—then stopped, as if to take a survey of each other—and again they advanced, but very slowly, till almost close. There was now a pause for a moment; after which the lion stooped a little as if meditating an upward spring, in order to fix his dreadful claws in the neck of his adversary; but the horse seized the opportunity, and making a slight but deliberate plunge with one leg in advance, he struck the lion on the head, and with such fatal force as to lay him dead at his feet.'

'The remarkable pause,' said Mr. Lumley, 'which was made by those two noble creatures is, I believe, the practice of all combative animals when going to make their onset. I cannot give you better authority than that of our highly valued friend, Major R., who, you know, was not less remarkable in India for his scientific knowledge and military talent, than for his intrepidity. In the course of service he had frequently been sent with a detachment, to drive away from the wheat-fields and jungles the tigers that often prowled about the camps or even enter the villages; and he bears terrible marks to this day of the danger of such an employment. He has lately told me, that more than once he has owed his safety to that *moment* of observation when the animal seemed as if collecting his force; for, as it always took place at a very short distance, he seized that favourable pause, while his foe was stationary and steady, to take a deliberate aim at a mortal spot.'

7th.—In describing the changes that have been produced by the action of the deluge, my uncle has often dwelt on the vast force of large bodies of water, when moving with rapidity. He supposes that most of the valleys have been scooped out by those means; and he divides them into two classes: *longitudinal* valleys, or those which lie parallel to the chains of hills; and the *transverse* valleys, which intersect the chains. Caroline and I frequently talk over what he tells us, and we agreed to ask him, in our walk this morning, why the violence that tore out the valleys did not disturb the hills at the same time.

'Those mighty currents,' he replied, 'naturally made their first impression on some weak part;—the fragments that were thus detached assisted in excavating a channel as they rushed forward; and the more the water was confined to a channel, the more powerful was its action. But the hills have also been disturbed more or less; for the upper strata

appear to have been swept off from extensive ranges that they once covered. This is proved by the separated hills, which geologists call *outliers*; and which, having the lower strata exactly continuous with those of the adjacent range of mountains, but wanting the superior strata, show that the same convulsion which broke through and carried away the connecting parts, must also have torn off their summits. Another proof is the great quantity of their *debris*, or broken fragments, which are found scattered over parts of the country far distant from their original positions. In the gravel-beds near London, I have found pieces of basalt, though that species of rock is not known to exist within a hundred miles of the county of Middlesex.

‘These fragments,’ he continued, ‘must, therefore, have been transported by some agent that was equal to tearing up and carrying away the parent rock; and when it is considered that all gravel must have had its edges and angles rounded by the rubbing of stone against stone, you will perceive that this could only have been effected by the violent and long-continued action of currents of water; in short, by the tremendous surge and confused motion which accompanied a general deluge. That this deluge has been comparatively recent is clear, from the fact that fragments of primitive and secondary rocks are often found promiscuously mixed in the same bed of gravel. In one large bed, near Lichfield, may be found fragments of almost every rock in England, from chalk to granite; and many of the pebbles contain organic remains.’

We spent a couple of hours wandering up and down some of the valleys in the neighbourhood; and though a cultivated country is not the best theatre for a geological lecture, my uncle contrived to show us so many corresponding circumstances on the opposite sides of one of the transverse valleys, that it was quite evident to both of us, that the ridge had been formerly uninterrupted. We saw, also, many examples of the gravel he had mentioned, all more or less rounded and smoothed, and containing specimens of very different series. This was a delightful walk; for though one may acquire very fine ideas, at home, of the operations of nature, there is nothing like seeing them in their proper places.

As we returned home, my uncle told us that this water-worn *debris*, which covers many parts of the earth, is named

diluvium, from that great and universal catastrophe by which it appears to have been formed. This name is meant to distinguish it from the more modern debris daily produced by rivers and torrents, to which the name of *alluvium* is given.

'Diluvial gravel is highly interesting,' he said, 'not only as it assists in explaining the causes of the present state of the globe, but as it even indicates the direction of the great currents of the deluge. For instance—when, within a few miles of the neighbouring town of Gloucester, we see rounded pebbles derived from rocks which are found only in the mountains of the north-west of the island, we may be sure that a branch of that current must have rushed to the southward. It has, therefore, been a favourite object of some geologists to trace these travelled fragments to their native masses; and to discover the apertures in the mountain-barriers through which they had been swept.

'When the intervening country is nearly flat, there is no difficulty in ascribing the removal of the debris to the currents of which we have been speaking. But it is frequently found in situations that are separated by deep valleys from the parent hills from which it appears to have been torn. For instance, fragments of the primitive rocks that compose the Alps are found scattered on the sides of the Jura mountains, though between those two ranges the valley that contains the lake of Geneva is interposed. On the low hills, near Bath, we find the flints belonging to the chalk formation, though several deep valleys intervene. Many other examples might be given; and the way in which geologists obviate the difficulty is, by supposing that one set of currents tore off and transported these fragments, and that a *subsequent* rush of the waters excavated the valleys.'

My uncle ended by saying, that when the weather was more settled he would show us a part of the country at no great distance from Fernhurst, which would make us more clearly comprehend this interesting subject.

8th.—The wonderful way in which the use of tobacco has spread into every country of the world, in less than three centuries since its first discovery in America, happened be mentioned in conversation the day Mr. Maude spoke here; and we were all amused by his account of the mode of smoking in Turkey. The sumptuous pipes in fashion there are so unlike the little cigars in everybody's mouth

Brazil, that perhaps his description of them may entertain both you and Marianne.

The Turkish pipe, which is called a *chibouque*, consists of the tube, the bowl, and the mouth-piece, so that they are all easily separated and cleaned. The manufacturers of the tubes are seen at work every day in the shops of Constantinople, where there is a bazaar, or street of shops, entirely for their sale. They are made from the young straight stems of cherry-tree or jessamine, on which the bark is carefully preserved; they are from two to six feet in length, and are nicely bored with a wire auger. The nursing these stems, during their growth, is often the support of a whole family, and requires a good deal of attention. To prevent the bark from splitting in the heat of the day, each stem is swathed with wet bandages, and the least tendency to become crooked is counteracted, either by a judicious application of the bandage, or by more copiously watering the plant on one side than on the other. A perfectly straight stem, with a uniformly shining bark, is, however, a great rarity, and sells for about two guineas.

The bowls are made of a clay called kefkil, found in Asia Minor and in Greece. In its native state, it is soft and white, but when baked, it becomes hard; and, unlike the English pipe-clay, turns to a black or red colour. These bowls are made of all sizes; the Turks do not like them very large; but those exported to Germany, where they are polished and finished with great elegance, are as large as a man's hand. Mr. Maude says he was astonished by the piles of bowls in every shop of the bazaar.

The bowls are frequently ornamented with gilding, and the tubes with embroidery and jewels; but it is on the value of the mouth-piece that a Turk prides himself. None but the miserably poor would use anything but amber; and though the common sort are cheap enough to suit all ranks, Mr. M. has seen some which have cost a hundred pounds, not from their size, but from some favourite tinge in their appearance.

'With such a pipe,' he says, 'and with Saloniki tobacco, a Turk is supremely happy. Cross-legged on his Persian carpet, he enjoys it the whole day, and except to call for more tobacco, or for a cup of coffee, he seldom opens his mouth, as the smoke is emitted, from time to time, in long cloudy columns from his nose. Pipes take the lead in

every visit, and are preliminaries to every conversation. The most flattering compliment a Turk can pay to his guest is to present him with his chibouque warm from his lips; and I shall never forget the mixed look of indignation and contempt which a Pashaw of three tails threw at an Englishman, who unwarily wiped the superb amber mouth-piece before he introduced it between his own lips.

WEEK 36.

Mosaical Law—Obedience founded on the inward Principle—Robin Redbreast's Nest—Calendar—Bertha's success in her Garden—Adjutant Bird—Christian Hottentots—Submarine Forests—Ancient Church of Sutton.

April 9th.—Sunday. ‘Hear, O Israel: The Lord our God is one Lord: and thou shalt love the Lord thy God with all thine heart, and with all thy soul, and with all thy might. And these words which I command thee this day shall be in thine heart: and thou shalt teach them diligently unto thy children, and shalt talk of them when thou sittest in thine house, and when thou walkest by the way, and when thou liest down, and when thou risest up.’—Deut. vi.

After reading the whole chapter, my uncle called our attention to the above verses, and said, ‘The characteristic excellence of the Mosaical law consists in the inward principle on which obedience to it was founded; in other words, on the love of God. This is fully unfolded in the admirable commentary of Moses on the commandments, where we see that the love that is expected from us must be accompanied with the full vigour of our feelings; and that it must be daily excited by a constant and grateful sense of the long-suffering and forbearance we have already experienced—of the blessings we still enjoy—and of the promises held out to us by a God of mercy, of goodness, and truth. This is the love which should be the principle of all our motives, and the guide of all our actions. This is the love which expands our hearts, not only into grateful adoration towards the Author of our being, but into benevolence towards our fellow-creatures. “Thou shalt love thy neighbour as thyself: I am the Lord.” This emphatic conclusion shows that we are bound to do so for the Lord’s sake; and throughout the Mosaical law you will find that the love of God was made the basis of the love of our neighbour, as well as ~

all our other duties. In the same manner, our Saviour declares that on these two commandments hang all the law and the prophets ; that is, the whole religion and morality of the Old Testament.

'It appears,' continued my uncle, 'to be peculiar to the Jewish and Christian dispensations to have solemnly laid down the principle of the love of God as a ground of human action: for, though some wise and excellent heathens had certain elevated ideas of the Deity, none seem to have inculcated the love of the Deity as a governing motive of human conduct. This Moses did most expressly; and Christ not only adopted and ratified what the law had already declared, but singled it out, and gave it pre-eminence over the whole body of precepts which formed the old institution.

'Let this noble principle then be pre-eminent in our minds; let us, who enjoy so many social comforts at home, and who have been happily taught to behold in our walks the beauties of this beneficent creation; let us, who can lie down to repose in health and security, and who can rise up refreshed to perform our duties; let us, my children, fill our hearts with the love of God; and let it purify our thoughts, direct our words, and govern our actions.'

10th.—I find great amusement in watching the young birds that are now coming out, and in observing the tender care with which their parents feed them. There are several nests in the tall trees near my window; and, in a thick bush in my quarry-garden, a favourite robin, who used to hop on my hand, and feed there, all the winter, has four young ones: I have named them after Mrs. Trimmer's dear little redbreast family, of which Marianne and I were so fond.

Robins seem less afraid than most birds of the human haunts; and my aunt says she has a friend, in whose bed-chamber a pair actually built their nests, and brought up their young till it was time to fly away. The lady used to leave her window open all day; and often sat there to watch their manœuvres, and to listen to their sweet song. They seemed to be aware of their comfortable quarters, and fiercely attacked any other birds that intruded themselves.

She also mentioned a singular circumstance of a wren, a bird that is never very familiar. A gentleman having occasion to repair some paling that was attached to an old hollow yew-tree, the workmen discovered a nest in a small

hole in the stem, with nine little unfledged birds. He was fortunately on the spot, and had it placed on the window-sill of his study. The old wrens soon followed; and, even when it was taken into the room, or held in the hand, they boldly did their duty to their offspring. They repeated their visits for sixteen hours daily, coming every two or three minutes with fresh supplies of food, which the little things greedily devoured. When this was told, I well remembered having heard grandpapa tell it of himself long, long ago.

This season, I suppose, must be remarkably forward, for we have had quantities of primroses and other flowers already, though Warton says of the first of April,

Scarce the hardy primrose peeps
From the dark dell's entangled steep.

I should tire you with the long list of leaves or flowers opening or already burst out; but I have kept a very exact account of them in *my* naturalist's calendar; and when you come home, Mamma, you shall see it, and we shall be able to compare it with the advance of spring in some other year. Spring is really delightful; the great change from winter is so animating, and so full of interest to the gardener and farmer.

My hyacinth and jonquil beds are in great beauty; and, without vanity, my garden looks so well, that not only my cousins, but even my aunt and uncle, congratulate me on my industry and success.

Franklin is very busy now in every part of his farm; yet he pays constant attention to the workmen who are building his house, which is already far advanced: he says it is inconceivable how much waste he prevents by keeping his eye on them. Little Charles is beginning to be useful; his understanding is quick, and he already speaks plain English. The Franklins keep him always with them, without seeming to watch him, in hopes of breaking the habit of pilfering. His relations are not inclined to take to him, so that my aunt will have a full opportunity of trying her benevolent experiment.

11th.—Caroline and I had a long walk, and a long conversation to-day with my uncle, about the *alluvial* change on the surface of the earth. I wish I could tell you all I said; I can only give you a little sketch of it.

‘ Since the last great and general convulsion produced by the deluge, many gradual changes have occurred, and are every day occurring, from causes which we may easily trace. We see destruction going on in one place, and new formations in another; we find headlands and cliffs undermined and washed away by the incessant action of the waves; and we as often find the materials, thus carried off, thrown up again, and forming either extensive tracts of new land along the less exposed parts of the coast, or new banks and shoals in the adjoining sea. The action of frost and snow, and rain, have all a similar tendency; ice, by swelling in the rifts and crevices of the rocks, detaches small portions; the rain washes away the finer parts; the melting snow, which forms the winter torrent, carries down the larger fragments, and, dashed against each other, their angles are rounded off. The looser materials of the soil through which these torrents pass are still more easily swept away; and in this manner, year after year, the surface of the mountain is conveyed into the valley. As the torrent reaches the level ground, its rapidity lessens, the larger fragments proceed no farther, and only the earth and sand reach the river, where they subside to the bottom, and form alluvial flats, and push out the *deltas* which may be seen at the mouths of almost every river. Some of the prodigious deltas made by the great rivers of the continent, I think I mentioned to you in one of our earliest conversations, as well as the great deposit of new land on the coast of Italy.

‘ Fortunately, over a large part of the earth’s surface, these wasting causes have no influence; the green sward which clothes it is an effectual protection. The barrows of the ancient Britons, though above two thousand years old, retain their original outline, and the fosse surrounding them is still distinct. Even on the sides of mountains, where the causes which I have described are always more or less in operation, still there is a degree at which further waste will be checked; the abrupt precipice may in time be broken down into a slope; but vegetation will creep up, and that slope will then be defended by its grassy coat.

‘ Even the mighty action of the sea has a similar tendency to impose a limit to its own ravages; for it wastes its fury in vain on the barrier of loose stones which it had beaten from the cliff that they now protect.

‘ On some coasts, however, the agency of the sea does

produce an injurious change. Where the shore is low, and consists of a flat, sandy bottom, the sand is thrown up by the surf; at every reflux of the tide, it becomes partially dried; the winds blow it higher up, and thus ranges of sand-hills are formed parallel to the beach. They encroach on the land so rapidly, that districts, which a few years ago were inhabited, are now become desert plains of sand. This takes place on a large scale, in many parts of the world; even in Norfolk it has been found that the only means of arresting the progress of the sand is to plant thick hedges of furze. On the east coast of Scotland, much property was laid waste by this destructive enemy, whose advance was occasioned, about a hundred years ago, by the imprudent removal of the trees and the *bent-grass* which grew on the sand-hills. The effects were so alarming, that an act of parliament was made in the reign of George II. to prohibit the destruction of that useful plant, the sea bent-grass, which Providence has kindly formed to grow in pure sand, and to keep it firm. The Dutch may be said to owe their existence to it, as its spreading matted root fixes the sand on those great dykes or embankments, which alone preserve the country from the inundations of the sea. This grass is called *murah*, in the Highlands; on the coast of Lincolnshire, *signs*; in Norfolk, *matgrass*; and by Linnæus *arundo arenaria*. It has long sharp-pointed leaves, and fortunately no cattle whatever will taste it. The sea cryngo, and the creeping restharrow, contribute also to defend us against these almost irresistible sands.'

When we returned home, my uncle showed me an extract of a letter from the unfortunate traveller, Bowdich; containing an interesting account of a sandy plain in Madeira, about eighteen miles from Funchal. I must copy a part of it for my dear Mamma.

'From Caniçal, by following a rough track, on the margin of shallow cliffs, of alternate tufa and basalt, for about a mile and a half, we reached a depression, more like a basin than a plain, and covered with a deep bed of sand. The sand has, in some degree, been fixed by the numerous branches of the forest-trees which it has enveloped, and which are spread over the surface as well as beneath it, like a net-work of roots. Both the branches and the trunks are encased in a thick hard sheath of agglutinated sand; and in some instances, the wood having entirely perished, the

envelopes are found empty, like tubes. Most frequently, however, the wood is still found within, where it has become a hard, petrified mass.

'The trunks, which remain in their natural position, have been broken off about a foot above the surface of the sand: how far they reach beneath it I cannot say, but there were two or three as thick as my body. They all appear to belong to the same species of tree, though of what family I do not think our present knowledge of the comparative anatomy of timber is sufficiently advanced to determine.

'This deposit of sand extends about three-quarters of a mile in each direction; and as innumerable fossil marine shells are mixed with it, as well as embedded in the envelopes, it must evidently have proceeded from an irruption of the sea, although it is bounded by hills several hundred feet high, on which there is no trace of sand.'

12th.—My aunt was so kind as to take Mary and me with her this morning, to pay a visit to Mrs. B., who has always many pretty curiosities to show. Her cousin, who is captain of an East Indiaman, has a constant commission to bring her anything that is interesting. Fortunately for us, he arrived a few weeks since, and has lately sent her a collection of Chinese drawings of flowers and insects, which are most beautifully coloured. They are, however, amusingly defective in regard to proportion; for some of the flowers are much diminished, while the insects upon them are represented of their natural size.

He brought her, also, a few stuffed birds; one of which, the adjutant bird, is such a prodigious creature, that I scarcely looked at the others. It measures from the crown of the head to the foot, five feet two inches; from tip to tip of the wings, fourteen feet; and the other dimensions are proportionably great. Its general colour is black, or slate-blue, though a few of the small feathers round the neck, and on part of the body, are white.

It is called the hurgill, in Bengal. They say that when alive it majestically stalks along, and looks like an Indian; and when seen near the mouths of rivers with extended wings, might be taken for a canoe. There is a curious superstition among the Indians, that the souls of the Brahmins possess these birds. They are very ravenous, and have a most capacious stomach, as well as a large craw, which hangs down the fore part of the neck like a pouch. The

captain told Mrs. B., that in the pouch of one which was killed, a land tortoise, ten inches long, was found, and in the stomach, a cat; even a leg of mutton, or a litter of young kittens, are easily swallowed. He heard of one that had been caught when young: he was easily tamed, and being always fed in the hall, he became so familiar, that at dinner-time he stood behind his master's chair; but the servants were obliged to watch him, as sometimes he would snatch a whole fowl off the table. He used to roost among the high trees, from whence, even at two miles' distance, he could spy dinner carrying across the yard, when, darting home, he regularly walked in with the last dish. As he stood near the dinner-table, he appeared as if listening to the conversation, turning his head alternately to whoever spoke.

The most curious thing about this species is the pouch. Dr. Adam, of Calcutta, supposes that it helps to sustain the birds in their great flights in the air, and also assists them in the waters in searching after their prey. From the structure of their limbs they cannot swim; and it appears that they have the power of distending this bag with air when they go beyond their depth. He says, that in the month of October, when the sky is not obscured by a single cloud, it is a beautiful spectacle to observe hundreds of these birds, performing their graceful evolutions at a vast height above the earth; with a telescope, however, he could not perceive whether the bag was distended.

This huge bird occupied so much of our visit, that I scarcely recollect anything else that I saw.

13th.—My aunt has been reading to us several interesting particulars of the Hottentots, from Latrobe's Journal of his visit to South Africa.

There is a striking difference, he remarks, in the conduct of the uncivilized, and of the Christian Hottentots. All those who have been converted by the Moravian missionaries have learned some useful trade, and, when they like their employment, work very industriously. They are naturally kind-hearted and obliging; and Christianity has had such a happy effect on them, that they live at the settlement of Gnadenthal united as brethren amongst themselves, and very grateful to their teachers.

The Hottentots have fine voices; they are fond of music, and are easily taught to sing. 'One morning,' Latrobe

says, 'at four o'clock I was awakened by the sweet sound of Hottentot voices singing a hymn in the hall before my chamber-door. They had learned from some of the missionaries that it was my birth-day, and I was struck and affected by this mark of their regard; nor was their mode of expressing it confined to a morning song. They had dressed out my chair at the common table, with branches of oak and laurel; and even the school-children, in order not to be behind in these kind offices, having begged of their mistress to mark on a large white muslin handkerchief some English words expressive of their good will towards me, they managed to embroider them with a species of creeper called cat's-thorn, and fastened the muslin in front of a table, covered with a white cloth and decorated with festoons of field flowers. This table, on which stood five large bouquets, I found in my room, on returning from my walk. The whole arrangement did credit to their taste. The words were, "May success crown every action."'

14th.—I asked my uncle, yesterday, whether a considerable change has not been produced in the level of the ocean, by the vast quantity of materials, which he had told us were carried into it by the rivers, and washed away from the coast by the waves.

He replied, that it was a very natural question, and showed that we reflected on what we had learned. 'But,' said he, 'though the quantity of materials which has for ages been accumulating in the sea must be vast, yet, when compared with the capacity of the whole ocean, its disparity is so obvious, that it probably can have had no visible effect in elevating the general level of the water. I say the general level, because it is possible, that in the mouths of large rivers, and narrow seas, it may have had some effect in raising the level of the flood tide! for the actual volume of water rolled in from the sea continues the same as it was formerly, but the space over which it has to diffuse itself being less deep and less broad, it must, therefore, force itself to a higher level. Other causes, however, may lead to the permanent rise of the sea in certain places; for instance, it is possible that the current which unceasingly rushes into the Mediterranean may, in the course of centuries, have gradually widened the entrance, and consequently a greater quantity of water now pours in. This, combined with the deposits from the Rhone, the Po, the Nile, and other rivers,

may, perhaps, account for the well-known fact of the eastern end of that sea being now higher than it was formerly ; many foundations of houses, and other vestiges of buildings, being visible there several feet under water.

‘ But none of these causes will account for the extensive submarine forests which have been discovered on several parts of the English coast ; for example, in Lancashire, and in the Bristol Channel, near Bridgewater. In excavating the West India Docks, in the Isle of Dogs, near London, a complete stratum of decayed hazel trees was found : the wood and bark were quite soft and decayed, but the nuts were in tolerable preservation. Your aunt, I believe, has some specimens of them, which she will readily show you. The remains of the submarine forests of Lincolnshire were examined, not very long ago, by a gentleman who has published a paper on the subject in the *Philosophical Transactions* ; and if Caroline will fetch the volume for 1799, she and you may read his account.’

I shall make a few extracts from it here for Marianne’s benefit.

This gentleman, having learned that there were several sunken islets along the coast where the remains of trees could be seen, took the opportunity of a very low tide to land on one of them near the village of Sutton ; and he found that it was a mass of roots, trunks, branches, and leaves of trees, intermixed with aquatic plants. An immense number of the stumps were still standing on their roots, which, as well as the bark of the branches, appeared almost as fresh as if they had been just cut ; and in the bark of the birch, even the thin silvery membranes of the outer skin were discernible. The wood, on the contrary, was decomposed and soft ; but he understood that the people of the country had often found very sound pieces of birch and oak of which they could make use. He remarked, that the trunks and thick branches were flattened, as if they had lain under the pressure of a heavy weight ; which is observable also in the *surturbrand*, or fossil wood of Iceland, and of the Feroe Islands. Above the matted branches, he found a thick layer of decayed leaves, which were scarcely distinguishable first ; but, after soaking a little in water, the leaves of birch and of other indigenous trees were easily separated.

In a well that was digging in the neighbouring village of Sutton, a similar stratum of decayed wood and leaves

been cut through, at the depth of sixteen feet, and, therefore, very nearly at the same level with that of the islets; it extends through all the eastern parts of Lincolnshire, and has been traced as far as Peterborough, more than fifty miles to the south-west of Sutton. The fishermen informed him that islets of the same kind are found as far north as Grimsby, on the Humber; so that this great subterraneous forest was nearly eighty miles in length; and as there can be little doubt of the woody islets along the coast having been a continuation of it, the breadth must also have been considerable.

Dr. Correa de Serra, who wrote this account, says, that a most exact resemblance exists between maritime Flanders and the opposite low coast of England, both in elevation above the sea, and in the internal structure and arrangement of their soil. They contain similar organic remains of marine animals, as well as of tropical plants; and they each have a stratum of decayed trees and compressed vegetable matter, below the present level of the sea. He, therefore, concludes that the two countries were once continuous; and, instead of supposing that the sea is now higher than formerly, he gives it as his opinion, that this part of the earth's surface has sunk below its ancient level. That the epoch at which this catastrophe took place must have been in a very remote age, he thinks may be proved from the sixteen feet bed of soil, which now covers the submerged forest; and because it appears, from historical records in the Academy of Brussels, that no change of that kind has happened in Flanders for more than two thousand years.

But the *uncovering* of the woody stratum in the Sutton islets, by the action of the sea, he refers to a comparatively recent date. The people have a tradition that their parish church once stood on the spot where those islets are now; and it is very probable that, before the skilful embankments were made which at present restrain the stormy inundations of the North Sea, the soil was gradually washed away by the waves, and the trees were thus left exposed.

When we had done reading the above, my uncle told us that he had himself visited the little hamlet of Sutton. The tides unfortunately were not low enough to expose the islets, or rather the sand-banks, which the Doctor mentions; but he saw a great number of the stumps and roots of the trees, which the country people had obtained at favourable oppor-

tunities. One fine oak stem had just been drawn on shore, it measured forty feet in length, and five feet in circumference; and the wood, though rather soft on the outside, was sound within, though all black. He cut off a few chips with his knife, and was so good as to give me one of them. So, Mamma, if the stratum of earth which now covers this submarine forest was deposited there by the deluge, it is clear that the tree my uncle saw was antediluvian; and that the oak chip in my possession was of the same growth of timber as that of which the Ark was constructed.

WEEK 37.

Prophecies contained in the Pentateuch—Preservation of the original Text—Petrifications—Casting of Plate Glass—Swallow—Alluvial Alterations—Heated Rivers—Extinct Volcanoes.

April 16th.—Sunday. A question, that Wentworth asked, about the object and meaning of the prophecies contained in Deuteronomy, led to some observations of my uncle's, which I will endeavour to give you.

'The prophecies of Moses increase in number and clearness towards the close of his writings. He appears to have discerned futurity with more exactness as he approached the end of his life. To be convinced of this, you have only to compare the records of history with his prediction of the successes as well as the dispersions and desolations of the Israelites; compare the rapid victories of the Romans, and the miseries sustained by his besieged countrymen, with his denunciations; and particularly compare his prophecies relative to the future condition of the Jewish nation, with their accomplishment which is still going on under your own observation, and which, indeed, may be called a standing miracle.'

'But are we certain that some of these distant prophecies have not been added in later times?' Wentworth said.

'I am glad that you have made that inquiry,' replied my uncle; 'because it gives me an opportunity of showing you how impossible it is that any such addition could have been made to the Pentateuch. In the fourth chapter of Deuteronomy are these words: "Ye shall not add unto the word which I command you, neither shall ye diminish aught from it."

'This prohibition preserved these books from the slightest

alteration; for it was considered so binding, that no copies were allowed to be made by any persons but the Scribes attached to the synagogue; and as the Jews were commanded to read portions of them every Sabbath day in their families, and as at certain times the whole "law" was publicly read to the congregation, it is evident that any alteration must have been noticed. There is a remarkable proof of the fidelity with which that injunction was obeyed, in this fact,—that the Samaritans have preserved the law of Moses to this day, as uncorrupted as the Jews themselves have done; although they were irreconcilable enemies, and though they have been exposed to all the changes and revolutions that can befall a nation during the long interval of two thousand four hundred years. No opportunity could have been more tempting than when the ten tribes separated from the house of David, and when each kingdom was zealously supported by a rival priesthood; yet both parties religiously preserved the books of the law, without changing a letter.

‘From the Christian era down to this day, the Jews, though dispersed into every country of the globe, continue to read the books of Moses and the Prophets every Sabbath day, in the original Hebrew; and, however they may differ from us, or among themselves, in the *interpretation* of various expressions, they have always considered the strict preservation of the original *text* as the most important of their duties. Those books have now been translated into so many languages, and cited by so many authors, and have been the subject of so much discussion from the times of the Apostles, that it is absolutely impossible that any fraudulent change can have taken place since that period. I may add, that the books of the Old Testament were translated into Greek by the command of Ptolemy Philadelphus, about three centuries and a half before that period; and they have therefore been, for upwards of two thousand years, in the hands of heathens and sceptics, who would have been eager to detect any alteration that might have been attempted.

‘It is, indeed, a most striking circumstance, that notwithstanding the many corruptions which the Israelites fell into, while they had the sole custody of these books, no omissions should have been made in the copies, nor any attempts to suppress those parts of the law which bore

directly on their misconduct ; and I think we may safely infer, that it was the will of Him who had given the law, and who had inspired the prophecies, that they should remain an indestructible " memorial to all generations." "

17th.—The more I learn from my uncle's kind geological conversations, the more I see the necessity of acquiring some knowledge of mineralogy, in order to understand them. In the mean time, Caroline and I find even the general views he gives us so interesting, that we seldom miss an opportunity of leading him to the subject. This morning he told us, that the *debris* of the hills, which accumulate in alluvial districts, usually continue in the loose form of gravel or sand, or mud, or clay, in which they were deposited. ' Their visible transformation,' he said, ' into stone is of rare occurrence ; in some circumstances, however, especially on the sea-coast, we may perceive the consolidation of the sand and gravel into thin strata. If a stream, impregnated with *oxide of iron*, should empty itself on the beach, it acts as a cement, and the process goes on rapidly. The northern coast of Cornwall affords some examples of this sort of petrification at home ; and abroad it may be seen on a much larger scale on the shores of Greece, Karamania, Sicily, and the West Indies. Abundance of sea shells and other organic remains are found in it ; and at Guadaloupe a human skeleton was discovered in the beach, imbedded in a mass of that description.

' Some springs of water are so highly loaded with calcareous particles, that the sediment they deposit soon hardens into stone ; and the *stalactites* which I showed you are formed in a similar manner, in the caverns and fissures of all limestone countries. Those were very small specimens ; but in some places, for instance in the celebrated grotto of Antiparos, one of the Greek islands, they are found of enormous magnitude, forming rows and clusters of columns that reach from the top to the bottom of that great cavern. The water, in slowly dripping through the rock, becomes saturated with lime ; as the drops exude from the crevices or trickle down the stalactites already formed, they are exposed to the air ; the watery part then evaporates, and the lime forms a hard stony crust, in some cases assuming the shape of small crystals.'

When we reached home, my uncle laid M. de Choiseul Gouffier's voyage on the table for us ; and we all read with

astonishment his description of that wonderful cavern, which is a thousand feet long, and full of these curious productions. The *stalagmites* that grow upwards from the floor are equally curious. My uncle explained to us, that when the quantity of water that trickles through the roof is more than can be evaporated from the surface of the stalactite, the remainder falls on the floor, where the same process occurs; and thus the upper and lower concretions proceed, till they meet each other, and form an entire column. In the middle of the widest part of the cavern there is a stalagmite of twenty feet in diameter and twenty-four in height; and on this superb natural altar, another French nobleman had mass celebrated by his chaplain to more than five hundred people, who surrounded it. The cavern was lighted by a hundred large torches and four hundred lamps; and the splendour of this illumination, reflected by the concretions which hung from the roof, or which lined the sides, is described as producing a very magnificent effect.

18th.—It will not be my uncle's fault if I do not pick up some information in this delightful house, for every day he tells us something new. He has just been describing the method of casting plate-glass; and I hope some day to see the whole operation myself.

The furnace for melting the materials is about eighteen feet long, and it is surrounded by ovens for *annealing* the plates of glass when made, that is, for cooling them slowly. The pots in which the materials are melted are made of a sort of tough clay that is found at Stourbridge, in Worcestershire, as it has the property of standing the most intense heat; and they contain about twenty hundred-weight of melted glass, or metal, as it is called by the workmen. The *cuvettes*, or cisterns, which convey the liquid glass to the casting table, are made of the same clay.

When the metal is sufficiently fluid, refined, and settled, which happens in about thirty-six hours, it is put, by means of ladles, into the cisterns, which are left in the furnace about six hours longer, till the little bubbles formed by this disturbance of the glass have all disappeared. The door of the furnace is now opened, and, by a chain, the cistern is drawn out upon an iron carriage, and conducted to the casting table. Here it is raised, by means of a crane, against two iron bars, which are so contrived as to incline the cistern, and empty the fiery torrent on the table.

This table is covered with a thick plate of copper, made very smooth on the surface; and it is supported on wheels, so that it can be moved from one annealing furnace to another. To regulate the thickness of the glass, two iron rulers are placed along the table, and on these rest the extremes of a very heavy roller, or cylinder of copper, which, as it moves along, drives the superfluous matter before it, and renders the two faces of the glass parallel. The iron rulers being moveable, serve also to determine the width of the glass plate, and to prevent the matter from running over the sides; the waste metal falls into a trough of water at the end of the table, and is reserved for the next melting.

As soon as the glass has cooled to a proper consistence, it is examined; and if any bubbles or flaws are found, it is broken up and returned to the melting pot: but if it has a sound appearance, the table is rolled to the mouth of the annealing furnace, and the plate is carefully deposited there. The heat of this furnace is at first very great, but it is diminished every day for a fortnight, by which time the glass is sufficiently annealed. This process renders the glass less brittle; for if suddenly cooled, my uncle says, it would fly into pieces when touched.

19th.—Much as we were all interested by the manufacture of plate glass, my uncle steadily refused to carry us any further yesterday than the annealing furnace: this evening, therefore, as soon as we were comfortably collected round the fire, after dinner, we reminded him that he was to describe both the grinding and polishing operations; and the following is the substance of what he said.

The annealing furnace generally contains six plates of glass; when they are withdrawn, they are cut square by a large diamond, which moves in a wooden frame, and they are then carried to the grinding room. There each plate is laid on a table, covered with a large slate or flag; and, to keep the glass steady, it is bedded on the slate in wet plaster of Paris, which you know has the property of *setting*, or becoming hard, in a few minutes. A smaller plate of glass or trical laid on the larger one, and being properly loaded posed to forwards and backwards, and having a constant lime form the sharp sand and water, the two glasses grind shape of sm a smooth, even surface. A ledge round the

When we events the sand and water from running off; Gouffier's voy* moveable strong plank cemented

to it, on which the weights are laid. An upright pin is fixed to this plank, to which a handle, like a coach-wheel, is attached for the workmen to give motion to the glass, and much skill is required to vary this motion in every possible direction; for if they were frequently to repeat the same stroke, the glasses would grind each other into furrows. But no matter what pains are taken to vary this motion, the two surfaces have always a tendency to become slightly spherical, one convex and the other concave; and to prevent this, the upper glasses of the different grinding tables are occasionally changed, so that two convex or two concave plates mutually correct each other.

When by these means a true surface has been obtained, finer sand is used, and then emery of increasing degrees of fineness, till the business of grinding is finished, and the plate is given to the polisher, whose operations my uncle was obliged to reserve for another evening.

20th.—Within the last few days the swallow has returned to us; I remember seeing it last autumn, but I did not notice it much.

I have observed that its motions are very rapid, and that it sometimes perches on the house, where it makes an odd little twittering noise. It is a very pretty bird; the back and wings are black, glossed with purple; and the breast white, with a spot of dull red upon it. I have often read of swallows in poetry, and I shall be glad to watch this little summer guest, as it sports in the sunshine, or skims along the surface of the water. This species is, I find, the house or chimney swallow, and is distinguished from the rest of the tribe by a small white spot on each feather of the tail, which is more forked than any other species.

Mary tells me that these birds generally appear in England about the middle of April, though some few may be seen a little earlier; and that they remain to the end of September. Their arrival, she says, is always considered to be the harbinger of summer, as they come here from warmer climates.

See, from bright regions, borne on odorous gales,
The swallow herald of the summer, sails.

There is a remarkable conformity, my uncle says, between the vegetation of certain plants, and the arrival of particular birds of passage. Linnæus remarked, that in Sweden the

wood anemone blows on the arrival of the swallow, and the marsh ruarygold when the cuckoo sings; and a similar fact appears to have been observed in other countries also, for the same Greek word signifies both a cuckoo and a young fig, from their appearing at the same time.

These house-swallows are the earliest of all the various species, as well as the most common. They build in barns, out-houses, and even in chimneys, the warmth of which they like; and they are said to pass with surprising address up and down the narrowest flues, to the depth of perhaps six feet, without soiling their wings.

All kinds of swallows, as they skim along the surface of the water, sip without stopping; but the common swallow only washes while on the wing; gliding through the pools many times together without seeming to stop.

21st.—After some little conversation about the alluvial alterations of the coast, and the changes produced in the interior by the different causes which my uncle had already mentioned, he said to us this morning, 'Those alterations are so gradual, that years are required to detect their operations, or to measure the rate of their progress; but the gigantic changes effected by volcanoes and earthquakes carry their desolation at once over whole districts. You have, no doubt, read an account of some of the destructive eruptions of Mount Vesuvius, by which, you know, the city of Herculaneum was overflowed with a torrent of melted lava, and Pompeii was buried, and remained concealed for many centuries under the ashes that were ejected from the crater.

'Large tracts of country seem to have been produced by volcanoes, and after the lapse of ages the decomposed lava has become a fertile soil. But even within the reach of history, new volcanic mountains have been elevated, and new islands have sprung out of the ocean. Pliny and Seneca describe two marine volcanoes that raised themselves out of the water in the Grecian Archipelago; and, in the beginning of the last century, the same thing again happened in the same place. In 1720 a small volcanic island rose out of the sea near Terceira, one of the Azores; and in 18 among the same group of islands, another violent eruption of lava produced an island of considerable altitude; but the following year it sunk into the ocean. In the sixteenth century, the Lucrine Lake, near Naples, disappeared, and Monte Nuovo, a volcanic hill six hundred feet high,

four miles in circumference, rose out of the place it had occupied.

‘Perhaps the most wonderful example I can give you of volcanic action is the elevation of Mount Jorullo, near the city of Mexico, in 1759. Alarming sounds, and repeated earthquakes, which continued for three months, had prepared the inhabitants for some dreadful convulsion; when at length a tract of ground, from three to four miles in extent, swelled up in the shape of a bladder, to the height of 500 feet. The terrified natives, who witnessed this extraordinary scene from the neighbouring mountains, asserted that flames burst from the ground; that red-hot rocks were thrown to a prodigious height; and that the surface of the earth was seen to heave like an agitated sea. The surrounding district is covered by hundreds of small cones, called *hornitos*, or ovens, by the inhabitants; they are about ten feet high, and from each a thick smoke ascends. From among these ovens six large masses arose from the plain, some of them upwards of 1200 feet; and the volcano of Jorullo, which has never ceased to burn, is now 1700 feet high. The place where this extraordinary convulsion took place was forty leagues from any volcano; and what renders this remarkable is, that Jorullo appears to be in the exact line of continuation of a chain of distant volcanoes, as if there were a subterranean communication. Though the fire is now much less violent, and though the plain, and even the great volcano, begin to be covered with vegetation, yet Humboldt found the air dreadfully heated by the small ovens, and the thermometer rose to 202° on being plunged into the aqueous vapour emitted by every fissure in the ground.

‘It is said that two rivers fall into the burning chasm, and that, at some miles’ distance, they emerge from the ground in a heated state. You may recollect Colonel Travers told you that he had seen the thermometer at 200° in a subterraneous spring called Nero’s baths, at Solfaterra, near Naples; and that he had eaten an egg which it had completely boiled in a few minutes.

‘It is computed that there are at present nearly a thousand volcanoes known to exist, and yet there is no doubt that, in a former state of the globe, they must have been more numerous, and far more active and extensive in their operations. Remains of extinct volcanoes of great size are scattered in almost every country, and geologists are every day discover-

ing large tracts of rocks and earths, which there is every reason to ascribe to volcanic agency.

‘Several have been found in Europe, which for many centuries must have been at rest. Great part of Italy and Sicily are clearly volcanic. Near Coblenz, in Germany, are the remains of several craters, and large masses of lava are seen strewn over the surrounding country. Along the Rhine, entire chains of volcanic hills are found; and near Spa, there are traces of some very large volcanoes, with deep craters half full of water. Great part of Languedoc and Provence, in France, are volcanic; and Auvergne presents an astonishing example of the activity of its ancient volcanoes, for the whole country consists of lava. In the East Indian islands there are great numbers; Sumatra, Java, and the Molucca islands, possess some of the finest volcanoes now existing. You know, from Humboldt, how numerous they are on the western side of South America and Mexico; and Nootka Sound, in the 50th degree of north latitude, was observed by Captain Cook to be entirely volcanic. In the Pacific Ocean, Easter Island is a mere mass of lava and basalt; and I need scarcely mention the Sandwich Islands, as you have been lately so much interested by Mr. Ellis’s account of the great volcano in Owhyhee, with its sublime gulf of boiling lava, seven or eight miles in circumference.’

WEEK 38.

Fulfilment of the Prophecies of Moses—Expectation among the Jews of the Messiah—Silvering of Glass—The Wryneck—Sandwich Islands—Memory improved—Classification of Ideas—Fossil Remains of Animals.

April 23rd.—Sunday. My uncle continued the subject of the prophecies of Moses this morning.

‘There are different kinds of prophecies in the books of Moses, some of which were fulfilled soon after the prediction—such as the conquest of the land of Canaan; and others the accomplishment of which was not to follow till after long interval of time, such as those that relate to the coming of the Messiah, and the dispersion of the Jewish nation but in all there is the same clearness and consistency, the same tone of inspiration and authority, and the same internal proofs of their truth. The Jews have always look

on him as by far the greatest of all their prophets. They assert, that the others received the divine communications by dreams and visions; whereas they were given to Moses by an immediate revelation from God.

‘In the most important of all his prophecies—“The Lord thy God will raise up unto thee a prophet from the midst of thee, of thy brethren, like unto me; unto him ye shall hearken”—Moses does not say a priest or a king, though the Messiah was to be both; but “a prophet,” in order to put the people on their guard not to look for him among any of their priests or kings. They were not to expect a person clothed with the external honours of the throne, nor ranking high in the priestly form of their government; but were to consider divine inspiration as the true test of that great prophet to whom they were to hearken, and who was to be the future head of their religion.

‘In consequence of this prediction, an expectation of some extraordinary prophet had always prevailed among the Jews, and particularly about the time of our Saviour. They understood and applied it, as well as other similar prophecies, to the Messiah, who they admitted would be as great as Moses; but, forgetting the distinct explanation with which it was accompanied, they looked for pomp and splendour, instead of the quiet manifestation of divine power on suitable occasions; they looked for the worldly attributes of dominion, instead of the meekness and humility which had characterized Moses, and which entitled him to use the expression, “like unto me.”

‘When our Saviour had fed five thousand men by a miracle like that of Moses, who fed the Israelites in the wilderness, then all those that were present exclaimed,—“This of a truth is that prophet that should come into the world.” St. Peter and St. Stephen* declared to the people, that the prophecy directly applied to Jesus, for he fully answered the definition of a prophet like unto Moses. He was by birth a Jew of the middle class, like Moses. He had immediate communication with the Deity, and to him God spake “face to face,” as he had done to Moses. He was a lawgiver as well as Moses, and he performed “signs and wonders” greater than those of Moses. “I will put words in thy mouth,” God said to Moses; and our Saviour says, “I have not spoken of myself; but the Father which sent

* Acts iii. 22; vii. 37.

me, he gave me a commandment what I should say, and what I should speak."

'There is another circumstance to which I would call your attention. There are instances of kings, both Pagan and Jewish, who were described, long before their birth, by these holy men whom the Lord inspired; but we do not find that any prophet was ever foretold by an antecedent prophet; this pre-eminence was peculiar to the promised Deliverer.

'Several prophecies in the Old Testament plainly ascribe the destruction of the Jewish church and nation to their rejection of the Messiah. The words in Deuteronomy xviii. 19, are remarkably strong. "Whosoever will not hearken unto my words, which he shall speak in my name, I will require it of him." Daniel expressly assigns this as the cause of the destruction of their city and temple; and Zechariah describes the future repentance and mourning of the whole nation for their sin of "piercing," or crucifying Christ, as preparatory to their general restoration.

'And,' added my uncle as he finished, 'let us hope that the time is fast approaching, when, instead of a wandering and despised people, we may see the whole Jewish nation repenting of their former obduracy, and yielding up their unbelief to a full, though tardy conviction.'

24th.—We claimed my uncle's promise this evening, of describing the mode of polishing glass. 'When the grinding operation,' said he, 'has been completed on both sides of the glass, it is again secured in plaster on a flat table, and the surface is rubbed with a block of wood covered with several folds of woollen cloth. The workmen supply the cloth with polishing powders, such as crocus, tripoli, and putty, beginning with the coarsest, and changing gradually to the finest.'

Wentworth observed, that he had never seen putty in a powdered state.

'The putty of which you are thinking,' my uncle replied, 'is a mixture of chalk or whiting with linseed oil, for the use of glaziers; but the putty to which I alluded is the oxide of tin. Crocus is a preparation of the brown oxide of iron; and tripoli is a natural earth, which was formerly imported from Tripoli, in Africa, but is now found in other countries. Both the grinding and polishing of plate-glass is performed in the large manufactories by the steam-engin

We begged of my uncle to describe to us the process of silvering, so as to make looking-glasses. 'The coating a plate of polished glass with a thin pellicle of quicksilver, in order to give it the power of reflecting, is a very pretty and easy operation. I think Wentworth might readily perform it on a small piece of glass. Blotting paper is first spread on the table and sprinkled with powdered chalk; and over the paper is laid a sheet of tin foil—that is, tin beaten out in the same manner as gold leaf. On the tin foil quicksilver is poured and equally distributed, and cleaned from every speck by means of a hare's foot. Over that a sheet of thin smooth paper is to be spread: fan paper is the best; and on this paper the glass is placed. With the left hand you are to press down the glass, while with the right the paper is drawn out, and with it most of the superfluous quicksilver. The plate is then to be loaded with a great weight, to squeeze out more of the mercury; and, lastly, the glass is set nearly upright, that every particle that is not amalgamated with the tin may ooze out; for the thinner the coating of mercury, the more perfectly the metal adheres to the glass.'

If ever I should be in the neighbourhood of a plate-glass-manufactory I will endeavour to see the whole process; in the mean time even the little knowledge one can pick up from a general description is better than entire ignorance. Wentworth lost no time in making an experiment of the silvering operation. My uncle furnished him with tin foil and quicksilver; my aunt supplied paper, and a small rubber of cloth instead of the hare's foot; and we all assisted. There was a little bungling at first, but after a few trials we succeeded in making a scrap of looking-glass, which Wentworth intends to frame for Grace's doll.

'As glass was comparatively a late invention, uncle, what were the looking-glasses which are mentioned in Scripture?'

'The word,' said my uncle, 'should have been translated mirrors; they were formerly made of brass, or of a mixture of brass and silver, which takes a very high polish; and this inadvertence of the English translators is the more singular, because the context removes every difficulty. In the passage of Exodus* to which you refer, the laver is described to be made "of brass of the looking-glasses." Glass could not possibly have been converted into brass; but if the word be rendered by mirrors, the sense would be

complete ; that is, the laver and the foot of it were made of brazen mirrors.

'In Turkey, the common domestic mirrors at this day are made of brass ; but I have heard that in Persia they are sometimes made of steel, and slightly convex. The metallic mirror, or speculum, which is now used in a reflecting telescope, is composed of about two parts of copper and one of tin ; but what metals were employed by the ancients in their burning mirrors is not known.'

'You allude, I suppose, papa,' said Frederick, 'to the famous concave mirrors with which Archimedes destroyed the Roman fleet ?'

'Long before his time,' my uncle replied, 'concave mirrors had been constructed, by which the sun's rays were so concentrated as to burn substances placed in the focus : but those used by Archimedes were not concave—they had plane or flat surfaces ; and it was by the combination of a great number that the effect was produced. For you can readily conceive that whatever portion of the solar heat can be conveyed by reflection from a single plane surface, the effect will be doubled if the rays from another plane surface be directed to the same spot. Five or six times the direct heat of the sun would set dry wood on fire ; but as more than half the heat is dissipated by reflection and by other causes, we may say that eighteen or twenty small plane mirrors would be quite sufficient for that purpose. The Count de Buffon tried a great many valuable experiments on this subject ; with 154 mirrors he succeeded in burning wood at the distance of seventy yards, and in fusing several metals at eight, ten, and even twelve yards.

'There was another circumstance in your question, Bertha, on which I must set you right. It is true that glass has been brought to great perfection by modern skill, but glass was known in the earliest ages of which any remains of art are now extant. The mummies, for instance, which have been brought home from Egypt, are ornamented with beads and bits of coloured glass. Pliny describes the manner of making it ; and there are various authorities for believing that glass was even used in windows before the third century.'

25th.—The nightingale, the next bird that appears after the swallow, has arrived, and I have twice had the pleasure of hearing the sweetness, fulness, and power of its melody.

It is supposed to visit Asia during its absence from England, as it does not winter in the south of Europe or in Africa, but is found at all times in the East, from Persia to Japan. I must acknowledge that its song is more agreeable than that of the bird we call nightingale in Brazil.

The wry-neck and the cuckoo, which I have just heard, arrive here very soon after the nightingale. The wry-neck is a very pretty little bird; the neck and breast are of a reddish brown, and crossed with waving bars of fine black: it sits so very erect on a branch, that its body appears to bend almost backward, while it is constantly turning its neck quite round from side to side; and it also has the power of erecting the feathers of the head like a jay. I have seen it feeding on ants, which it dexterously transfixes with the sharp bony end of its tongue; and the country people say, that the young ones, while in the nest, make a hissing sound like that of little snakes, which deters boys from plundering their nests.

There is something very cheerful in the notes of the cuckoo and the rail. They serve to mark one of the steps by which this changeful and busy season of spring steals on us with all its gradations of pleasure and interest; and which, dear Mamma, I cannot help thinking preferable to the unvarying brilliancy of Brazil.

‘Now Nature, soothed, assumes her wonted charms,
And, like an infant still’d, laughs through her tears,
That glittering hang on every bloomy spray.
The birds their woodland minstrelsy renew,
In chorus universal; while the sun
Gilds with effulgence sweet the azure vault,
And paints the landscape with a thousand flowers.’

I have seen the mole cricket to-day; it is a most remarkable insect, endowed with wonderful strength, particularly in its fore legs, which are fitted for burrowing. The shanks are broad, and terminate obliquely in four large sharp claws, like fingers; and the foot, which consists of three joints, and is armed at the extremity with two short claws, is placed inside the shank, so as to resemble a thumb, and to perform its offices. The direction and motion of these hands enable the animal effectually to remove the earth when it burrows under ground; and in wet and swampy situations, which it loves, it excavates very curious apartments.

There is the prettiest variety of wild flowers now in bloom

all over our part of the forest ; not gaudy and dazzling, like the natives of the Brazil forests, but small and delicate, and beautifully marked and tinted. I am sorry to say the prim-roses are fading ; but wild violets, the wood anemone, and millions of cowslips, with their pretty golden bells, make up for their loss.

I had almost forgotten to tell you that the buds and leaves of the branches I had in water have all withered away : ashamed, I suppose, to appear, now that there are abundance of real leaves.

27th.—My aunt has been extremely interested by an account she read of the progress of Christianity in the Sandwich Islands.

It is almost a singular instance of a nation by general consent destroying their idols, and being sensible of the insufficiency of their own religion. The small opposition made to the change, and the manner in which many of the chiefs publicly professed Christianity, give one every reason to hope that it will take root in the minds of the people, and that the progress of Christianity and civilization will advance together. It appears to have been a spontaneous act of those intelligent and amiable islanders ; and when the Blonde frigate arrived there in 1825, the new faith they had adopted had already materially purified their morals and improved their manners.

Besides wooden idols, the uninstructed natives had long worshipped the deities of their island at the foot of the stupendous mountain of Mouna Roa, imagining their favourite abode to be in the volcanoes it contained. Offerings were frequently made to court their favour ; and at every fresh eruption of lava, hogs were thrown alive into those fiery gulfs, to appease the anger of Peli, the principal deity. To put an end to these superstitions, Kapiolani, the wife of a chief of high rank, who had recently embraced Christianity, determined to descend into the great crater, and, by thus braving the volcanic deities in their very home, she hoped to convince the people that they existed only in their imagination. A crowd of her friends and vassals accompanied her up the mountain, to the first precipice that bounds the sunken plain : there most of them stopped or turned back ; and at the second, her remaining companions earnestly implored her to desist from her dangerous enterprise, which could only serve to tempt the vengeance of the deities whose

sanctuary she was about to violate. She proceeded, however, to the verge of the crater, and, being again assailed with their entreaties, she calmly replied, 'I am resolved to descend; and if I do not return safe, then continue to worship Peli; but, if I come back unhurt, you must learn to adore the God who created Peli.'

Few of her attendants had sufficient courage to follow this heroic woman; but she steadily persevered, and at length reaching the bottom of the dreadful chasm, she triumphantly thrust a stick into the burning lava, and for ever dissolved the spell of superstition which till that moment had bound the minds of the astonished spectators. Those who had expected to see the incensed goddess burst forth and destroy the daring intruder, were awe-struck; they instantly acknowledged the superiority of the God of Kapio-lani; and from that time no reverence has been paid to the fires of Peli.

28th.—When I came down to the library early this morning, my uncle asked me several historical questions: taken thus by surprise, I should some months ago have been unable to answer, though, perhaps, I might have been acquainted with the facts; but now I conquered my difficulties in a tolerably satisfactory manner; and my uncle congratulated me on the improvement of my memory, or rather of my recollection.

'I believe, uncle, it is more from my not being quite so much frightened as I used to be at being examined; and besides, since I have been in this house, I have gained more knowledge.'

'Yes, my dear, you have gained more knowledge; but of what avail would it be if your memory could not supply you with a key to it? You have materially improved your recollection; and I will tell you how: first, by increased *attention*, the foundation of all memory; and next by *exercise*, for every power of body and mind may be strengthened by constantly, though moderately, applying them to their proper purposes. You have also, I think, wisely aided your memory by some of the expedients that I formerly hinted to you.'

'Do you mean, uncle, the classification of one's knowledge, and the endeavour to connect detached ideas?'

'Yes,' said he; 'I have carefully observed you, Bertha; and I perceive that you have in some degree acquired the

faculty of catching the points by which ideas are related to each other, and thus of associating them in your mind with some one common principle. This is the true way of strengthening the memory, and, indeed, at the same time, of improving the understanding. Every one who steadily pursues it will find that the facility of this kind of arrangement increases every day, till at length it becomes so habitual as to be performed almost mechanically ; that is, without the intervention of the will. The advantage is obvious : every new fact, every new idea becomes a catch-word to some other ; and when referred to the common principle by which they are all combined, the mind rapidly and almost unconsciously runs through every link in the chain, and literally *recollects* those which may be wanted for the subject under consideration.'

'Do you not think, too,' said I, 'that as we increase our knowledge, those links become more numerous ; and therefore, that the more new facts we learn, the more easily we can recollect the old ones?'

'In some measure,' he replied ; 'but it is not merely by the new facts or ideas that we acquire, that our real increase of knowledge must be estimated ; it is by the number of relations which they bear to those already in the mind. *New* knowledge does not merely consist in our having access to a new object, but in forming new combinations of the ideas which it excites with our former ideas of similar objects ; it is not by loading the memory with insulated facts, but by putting those facts in their right places, that we augment our stock of knowledge.'

'Indeed, my dear uncle, I feel the truth of that every day ; for the more I know, the more my curiosity is excited, and I ramble on from one thing to another, till my head contains nothing but a confused heap of unconnected facts. Then, when I go back and try to put them in some sort of order, I find that the most useful circumstances are forgotten, and only those well remembered which happened to connect themselves with things long known.'

'That leads me,' said he, 'to another point, which I would earnestly press on your attention,—*discrimination*—or the selecting from the necessarily confused mass of new ideas which are constantly presenting themselves, those of the greatest importance. By grasping at all, you lose the real acquisitions within your reach ; and though the sacri-

fice may at first appear great, you will be a gainer in the end. Every day your selection will be more judicious, and in time more abundant; and your knowledge of useful and connected truths will advance gradually and securely, because you will have learnt to hinge them properly together, without encumbering your mind with those that are insignificant.'

I then asked him if he approved of my writing this journal, and whether he advised me to continue it.

'Certainly I do, Bertha, because I am sure it is highly satisfactory to your mother, not only to know what you are doing, but to trace the progress of your mind. Besides, though I suspect that no young lady can write a great deal without introducing a little desultory matter, yet, from the pages you have occasionally shown me, I am sure there is much in your journal that may be advantageous to Marianne. Indeed I am glad you mentioned it, for I think it forms no bad illustration of the unconnected manner in which knowledge presents itself in every-day life; and if our present conversation finds a place in it, tell your sister, from me, to attend to what I have said about discrimination, and to try her skill in selecting, and classifying in her memory, the many useful topics on which you have touched.

'The benefit to *yourself* of committing to paper the detailed knowledge that you acquire is quite another question. As a help to which the memory may refer, I am inclined to think that it is injurious; except in so far as the time occupied in writing forces one to dwell sufficiently on the ideas, to perceive their analogy with others. But you may, I think, make a common-place book really useful, by stating your general impressions of the books you read, and of the discussions you hear; and by sometimes recording those passing thoughts which suggest themselves to every reflecting person. By thus frequently marking the state of your mind, you can hereafter judge of its progress; and you will be able to correct the prejudices which may have impeded its steady improvement.'

29th.—I begged of my uncle to describe some more of the remarkable animals that have been found in a fossil state. He readily complied; and as it is possible that I may one day have an opportunity of seeing some of these curious petrifications in the museums, I carefully noted what he told us.

‘ One of those huge oviparous quadrupeds to which the name Monitor has been given, was found at Maestricht, in soft limestone rock, mixed with flints. The skeleton was about twenty-four feet long; the head four feet; and, from the great breadth and strength of the tail, the animal is supposed to have inhabited the sea.

‘ There are but two living species of sloths known; and two fossil animals have been found, which seem nearly allied to them. One of these animals, the megalonix, is of the size of an ox, and was first discovered in a limestone cave in Virginia. The other, the megatherium, is as large as a rhinoceros: its remains have been found only in South America; and it is a curious fact, that, greatly as these animals exceed the sloth and the ant-eater in size, they not only appear to belong to the same family, but their bones are found only in America, the very country inhabited by sloths and ant-eaters.

‘ The gigantic fossil elks of Ireland are also an extinct species: they are found under bogs, or in deep marl-pits; and generally in an erect position, as if the herd had been suddenly overwhelmed by the mass in which they are imbedded, while it was in a fluid state. The distance between the tips of the horns of a skull, now in the museum of the Royal Society of Dublin, is eleven feet and ten inches; and I have heard that a still larger specimen has been discovered in that country.

‘ The skull of the fossil ox, or buffalo of Siberia, cannot be identified with any of the known species of this animal; and it is conjectured to have lived at the same time with the fossil elephant and rhinoceros, as it is found in the same alluvial tracts.

‘ Two distinct species of elephant are at present known—the African and the Asiatic; but only one fossil species has hitherto been discovered, which has been called the mammoth—a name borrowed from the Russians. Though differing from both the existing species, principally in the structure of the teeth, it more nearly resembles the Asiatic than the other. The remains of this animal have been found also in the alluvial soil around London, and in a great many parts of England, and even in this country. In Ireland also, in Sweden and Norway, and in almost every country of Europe, they have been discovered. Humboldt found their teeth in South America; the North American natu-

ralists have also found them; and lately, Lieutenant Kotzebue, the Russian navigator, perceived them in an *iceberg* near Behring's Straits. But it is in Asiatic Russia that they occur in the greatest abundance: there is scarcely a river there with alluvial banks, that does not afford remains of the mammoth, and generally accompanied by marine shells.'

My uncle then was so good as to go to the library for an account of a fossil elephant that was found in a state of perfect preservation, though its great antiquity is evident, from the whole race to which it had belonged being now extinct. The account was drawn up by the celebrated M. Cuvier, from observations made on the spot by Mr. Adams.

'In the year 1799, a portion of an ice-bank, near the mouth of the river Lena, in the north of Siberia, having fallen down, a Tungusian fisherman perceived a strange shapeless mass projecting from the remaining cliff of ice, but at a height far beyond his reach. The next year it was a little more exposed, by the dissolving of the ice; and, in the end of the summer of 1801, he could distinctly see that it was the frozen carcass of some enormous animal. He continued to watch it till the year 1804, when the ice having melted earlier, and to a greater degree than usual, the carcass became entirely disengaged, and fell down from the ice-cliff on an accessible part of the shore. The fisherman carried away both the tusks; and so well had the ice preserved the ivory, that he sold them for fifty roubles. This circumstance having come to the knowledge of Mr. Adams in 1806, he travelled to the spot to examine the animal, but he found the body greatly mutilated; much of the flesh had been taken away by the natives to feed their dogs, and one of the fore legs had been carried off, probably by the white bears. The rest of the skeleton was entire; the head was uninjured—even the pupil of the eye was still distinguishable; and the ears were well covered with bristly hair. A large quantity of the skin remained, which was extremely thick and heavy; and there was a long black mane on the neck, the stiff bristles of which were more than a foot in length.

'About thirty pounds weight of reddish-brown bristly hair was collected in the mud, into which it had been trampled by the bears while devouring the carcass, as well as a quantity of coarse wool of the same colour. The wool was

evidently the same kind of covering that lies next the skin of all the inhabitants of cold climates ; and this very interesting fact proves that the fossil elephants of Siberia were residents of that country, and that they belonged to a race which no longer exists, which was fitted by nature for a rigorous climate, and which could not have endured the sultry regions where those animals are at present found, and where their skin is nearly bare.'

My uncle added that it was impossible to conjecture at what period this elephant had been buried in the ice, but that it was evident he had been frozen at the moment of his death, which sufficiently accounts for the preservation of the flesh. In cold countries it is common to preserve meat through the longest winter by freezing it ; and all kinds of provision are sent at that season from the most remote of the northern provinces to St. Petersburg.

Gmelin, a German traveller, tried how deep the ground had been thawed by the heat of a whole summer at Jakutsk, in 62° north latitude : he found it soft to the depth of two feet and a half ; there it became harder ; and at half a foot lower, it scarcely yielded to the spade. The inhabitants of that place keep their provisions continually frozen in caves which are only six feet below the surface.

WEEK 39.

On the Feast of the Israelites—The word Hosanna—May-day—
Bertha Imprudent—Cloth Manufactory—Importance of the Teasel
—Venice—Cause of her Fall—Fruitières of Switzerland.

April 30th.—Sunday. I asked my uncle to-day to explain to me the nature of those three feasts at which all the Israelites were enjoined to attend in the course of the year ; the feast of Unleavened Bread ; the feast of Weeks ; and the feast of Tabernacles.*

'Feasts,' he replied, 'were appointed to commemorate those great events with which the existence of the Israelites, as a separate people, was identified ; they also afforded opportunities of giving general instruction, of expounding the law, and of keeping up a useful connexion between the distant tribes, by meeting each other at stated times in the holy city. The first and most ancient of feasts, you know, was the Sabbath, a day of general rest, in memory of the

* Deuteronomy xvi. 16.

Creation ; and there was also a Sabbatical year of rest every seven years ; and a jubilee year every seven times seven years. The feast of Atonement took place in the seventh month ; the feast of Trumpets celebrated the first day of the year ; and in after times feasts were instituted on the restoration of the Temple, and on the deliverance of the Jews from Haman's plot.

' But of all the annual festivals, the three about which you inquire were the most sacred and important. The feast of Unleavened Bread was only another name for the feast of the Passover. It lasted seven days after the Paschal lamb had been killed ; sacrifices were offered on each of the days ; no bread but such as was unleavened was permitted to be eaten during its continuance ; and the first and the last days were observed with peculiar and impressive ceremonies. The departure of the Israelites from Egypt, and the wonderful acts of Divine power by which their liberation had been accomplished, were the objects commemorated at this great assemblage of the people ; but we have so often conversed on the Passover, that I need not renew that subject now.

' The Feast of Weeks,' my uncle continued, ' was so called, because it was kept at the end of seven weeks, or a *week of weeks*, after the Passover, that is, on the fiftieth day ; and therefore it has been also called the Feast of Pentecost, from a Greek word signifying fiftieth. It lasted seven days, and was held in remembrance of the law which was given to the people, at Mount Sinai, on the fiftieth day after their leaving Egypt. At this feast, two loaves of bread and a certain quantity of meal, to represent the first-fruits of the ground, were offered as a solemn and grateful acknowledgment for the harvest, which, in that fine climate and fertile country, had already commenced. The modern Jews keep this festival with great strictness ; but they mix various traditional rites with the ceremonies. In this country, I understand that they decorate their houses with garlands of flowers, and strew roses in the synagogues ; and, in Germany, each Jewish family has a high rough cake, to represent Mount Sinai, composed of seven layers of paste, to designate the seven heavens through which they pretend that Jehovah descended to declare the law to Moses. As the Passover was the type of the Sacrament of the Lord's Supper, so the Feast of Weeks was the type of our Christian

Pentecost, which took place fifty days after the resurrection, and on which the astonishing miracle was performed, of the gift of tongues to the apostles.

'The Feast of Tabernacles was established in the middle of the seventh month of the ecclesiastical year, or in the first month of the civil year, which began in September. All Israel were obliged to assemble in order to celebrate this feast, and to live in tents or booths made of green boughs, during its continuance. The same word in Hebrew signifies both tabernacles and tents, and this great religious festival was held in memory of the journey through the wilderness, and of the mode in which their forefathers had dwelt there in tents, during forty years. On the first day, the people, with branches of palm trees, willows, and myrtles in their right hands, and a citron bough, bearing its fruit, in the left, joined in procession round the altar, waving the branches, and singing *Hosannas*. The six following days burnt offerings were made, and the latest fruits of the year were presented at the temple; on the eighth and last day, the procession with branches was repeated, with still greater solemnity, and the whole feast concluded with what was called the *Hosanna Rabbah*, or the great *Hosanna*. This word literally means, "Save, I beseech thee;" it was a common form of religious blessing or salutation; and thus, to that ancient mode of solemnizing the feast of tabernacles, you may trace the branches that were cut down, and the acclamations of "Hosanna to the Son of David!" with which our Saviour was received on his public entry into Jerusalem.'

May 1st.—This has been a day of amusement; and the Miss Maudes and their brother, who came here yesterday, have greatly added to our gaiety. Very early this morning we all went out, not exactly to gather May-dew, but to see the numbers of people that went out Maying. Several May-poles and garlands had been erected; but we were most interested by that which the little school-children had dressed up opposite to their house. They had also placed an arch of flowers and hawthorn branches over the door; with a magnificent C in the middle of it, made of daisy-flowers strung on thread.

This was in compliment to Caroline, and, when she passed under it, they all joined in chorus, singing these lines of their own composition:—

We'll welcome Miss Caroline with flowers so gay,
To the school where she teaches us goodness and truth;
Oh! may she be happy on ev'ry May-day,
And most graciously pardon the follies of youth.

My uncle says it has been always the custom to celebrate May-day in this country, and that to have a pretty May-bush is still considered quite important.

In Huntingdonshire, Miss Maude told us that the children hang every place with garlands, and sometimes they make very pretty triumphal arches. To a horizontal hoop, two semi-hoops are fixed, so as to form a sort of crown, which is ornamented with flowers, ribbons, necklaces, spoons, and all kinds of finery. This is suspended across the road by a flowery rope, extending from house to house, while the children sing, dance, toss their balls over it, and ask money from the passengers. Miss Maude repeated to us their usual song.

The May-day Garland.

'To the lilac, laburnum, and iris, which cheer,
The hawthorn, the cowslip, and king-cob so gay,
Each beauty which gladdens the spring of the year,
And the kerchiefs and ribbons our friends have supplied,
In bows and in streamers are tastefully tied,
And form our sweet garland, our garland of May.

Beneath it we'll dance, and we'll throw up the ball,
And all shall be gladness, good-humour, and play,
We'll sing, and in chorus we'll join one and all,
And glad as the season, we'll lift up our voice,
And all, within measure and reason, rejoice
Beneath the gay garland, the garland of May.'

My uncle observed, that in Cornwall, where customs have been less changed than in most parts of England, the May-day ceremonies are kept up with great care. He learned from a friend, who lived in a remote town in that county, that all the houses were thrown open; lively music was everywhere heard, and the young maidens, decked with wreaths and festoons of flowers, danced along the streets, and in and out of the houses, which all lay open to receive these merry groups.

'The annual celebration of this day,' he continued, 'may be traced up to a very high antiquity. The Romans had their Floralia, or games in honour of Flora, during the

regular time and with equal force, and the shuttle flies to and fro from selvage to selvage as if it was alive.

At another loom they were taking off the cloth from the beam on which it had been rolled in the process of weaving, and many hands were immediately employed with iron nippers in trimming and cutting off the knots and threads. The obliging proprietor of the manufactory partly described and partly showed us the subsequent operations of scouring the cloth with potter's clay, steeping and *fulling* it, and then stretching it lengthwise to take out the wrinkles. This is repeated several times, then it is washed in clear water, and given wet to other workmen to raise the nap, by means of a flower called *teasel*, which somewhat resembles a thistle. When the nap is well raised on the right side, it is given to the shearers, and then to the dyer; and when dyed it is again washed in plain water, and spread on a table, where the nap is laid properly with a brush. It is then hung up to dry, and stretched in every direction; after which it is folded and laid under a press.

It seemed very curious to see a homely wild plant like the *teasel*, fresh from the field, used along with so much complex machinery: many imitations of it have been tried, but nothing answers so well as the beautiful little hooks contrived by nature. In the west of England, therefore, wherever the soil is dry and gravelly, teasels are cultivated on a large scale for the cloth manufactories.

I remember little more of what I saw or heard yesterday, except that my uncle remarked, as we passed a sheep-walk in our drive home, what an astonishing number of people combine their labours to produce any one manufacture, and how necessary the different trades are to each other. From the grazier, for instance, who rears the sheep and sells the wool, and the various artificers employed in preparing, spinning, weaving, dyeing, and pressing it, up to the retail shopkeeper who keeps the cloth ready for our use. 'But in fact,' said he, 'these are only a few links of the chain; we must recollect the numerous hands employed in making the machinery, the miner who raises the iron ore, the smelter who converts it into metal, the smith who works it, and the collier who supplies them with coals; the carpenter who constructs the frame-work, and the engineer who contrives the whole. Then come the merchants, and ship-

wrights, and sailors, who bring home from distant countries the articles requisite to colour the cloth, and the dyer, who, by the aid of chemistry, compounds them; and lastly, the farmer who cultivates the humble teasels. See, Bertha, what a prodigious number of heads and hands are thus toiling for the accomplishment of a single object, and, though all impelled by individual interest, yet all co-operating for the general good.'

4th.—As I am still paying for my imprudence, and confined to my room, kind Mary has been entertaining me with the conversation she had heard below stairs, and particularly with Mr. Maude's account of Venice. Nothing in Italy so much struck his imagination as the view of that city, with all her towers and pinnacles rising from the sea, where, the poet said,

' Venice sits in state, throned on her hundred isles ! '

But now it has a most melancholy appearance the port, which in times of prosperity was crowded with shipping, is now almost empty; and the muddy canals which intersect the town in every direction are no longer enlivened by multitudes of gondolas gliding swiftly through the water. The showy palaces which rise from the sides of these watery streets, were once adorned with all that painting and sculpture could perform; but they are now neglected, moss-grown, the habitations of owls and bats, and fast sinking to decay: and many of the great families who had inherited their wealth and honours in direct succession for a thousand years, are now obliged to part with their splendid mansions, or to see them gradually crumbling into ruins, from the want of means to repair them.

Notwithstanding all this, Mr. Maude says that Venice is still a magnificent-looking place; and amongst its many beautiful buildings, he describes the cathedral as being most venerable and interesting. It was built so long ago as the ninth century, and enriched with the spoils of Greece and of Constantinople. He once went through the city at night, to see the effect of moonlight on its superb buildings; but the few of them which were still dazzling with lamps, as if enjoying their former glory, made such a contrast with the pale light and dark shade of the moon, and with the general stillness, that the whole scene had even a more deserted appearance than in the day-time. Now and then the

gloomy silence was interrupted by the sounds of the harp or guitar, or by the wild and plaintive airs of a few gondoliers, as they kept time to the gentle splashing of their oars.

Mr. Maude, she says, added a great deal about the present government, the state of society, and the remaining commerce of Venice; and my uncle, who was much pleased with his observations, remarked that few of the charges recorded in history offered a subject of deeper interest than the long-continued grandeur and present fall of Venice. 'It rose,' he said, 'as it were, from the waves, when, on the invasion of Italy by the Huns, numbers of people took refuge in that cluster of islands where the city now stands. So early as the year 421, they formed a little state, strong enough to oppose the invaders, or at least to secure themselves from molestation. Commerce soon followed security; and from this small beginning arose that wealth and power which continued for many centuries, and which extended the influence of Venice over all the states with which she was connected. Her foundations were laid in the darkest ages of Italian misery; but she soon became the spectator of the dissolution of the Roman Empire. She witnessed the ravages of many continental wars, and the rise and fall of many nations; till at length she fell in her turn also. Somebody has well remarked, that she was the last surviving witness of antiquity, the common link between the two periods of civilization.

'Her whole history,' continued my uncle, 'has a paradoxical and peculiar character. Her romantic achievements in the East; the noble lead she took in the struggles of Christendom with the empire of the Turks; and the heroic defence she made against the attacks of numerous enemies, place her resources and power in singular contrast with the smallness of her territory. On the other hand, her selfish policy, her imperious conduct wherever her influence extended; and her deadly jealousy of the neighbouring republic of Genoa, rendered her the object of universal envy and hatred. While at home the rigorous despotism of her government, which was ill-concealed under the mask of republican freedom, and the inquisitorial tyranny of the senate, which silently pervaded every house, and controlled almost the thoughts of every individual, could tend only to alienate her subjects. These are points of deep moral and historical interest; but it may be safely said that her go-

vernment outlived the age to which it was suited ; no timely reform adapted it to the growing changes in the public mind—no concessions to the people united them in common cause with their haughty masters—and the fall of Venice may be ascribed more to her internal vices, than to the overpowering armies of France.’

5th.—I have been so much better all day, that I was allowed to go down to tea, and had the pleasure of hearing Mr. Maude describe the *fruitières* of Switzerland. I quite misunderstood that word at first ; for I find that it means a kind of dairy, something like that described to us by our Savoyard friends last winter. The person by whom the *fruitière* is managed receives their milk daily from all the neighbouring peasants ; he sells the cream, and butter, and makes the cheese ; and at the end of the season pays the contributors either in cheeses or money. He keeps an exact account, not only of the quantity of milk brought in, but, to prevent fraud, such as mixing it with water, he ascertains its quality by a kind of *hydrometer*, or floating gauge. Persons detected in cheating are struck out of the book, and lose what they had already contributed. The *fruitière* man who manages the business and keeps the accounts is paid by a small per centage on each cheese.

This plan is chiefly adopted in those parts of the country where the cattle are taken in summer to pasture in the mountains ; the farmers confide their cows to a man who lives in a chalet, such as Madeleine mentioned, and spends night and day in milking the cows, and in making and turning the cheeses.

The same practice has been introduced into Piedmont and Lombardy. All the dairies in which the Parmesan cheeses are made are supplied in this manner. The meadows of Lombardy, in the vicinity of the Po, are the most fertile in the world : being constantly watered, they produce three or four crops of hay in the season ; but as they are occupied by a great number of individuals, there are few who can support a dairy, because the making cheeses requires a large quantity of milk, the produce of at least fifty cows. To effect this, the Lombards have formed societies in order to make their cheese in common ; and twice a day the milk is sent to the principal house, where the dairy-man keeps an account of each person’s share.

This subject reminds me that my aunt has had a satis-

factory letter from Bertram and Madeleine. He is much improved in strength. She appears to be very happy, and the little girl is going on well

WEEK 40.

Prophecies of the Judgments of the Israelites—Invasion of the Romans—Tendrils—Fossil Remains—Their Structure—Tears of Old May-day—The Rose—Prized in Persia.

May 7th.—Sunday. Wentworth has been so much interested by the character of Moses, and by the explanations my uncle has occasionally given of his prophecies, that during the last week he prepared a long string of questions for this morning. His father was pleased by this eagerness to obtain information, and answered them all most kindly and fully. I need not repeat the questions, I shall only tell you the general substance of the answers; and you, dear Mamma, who are so well acquainted with the subject, will easily trace my omissions.

The prophecies of Moses may be considered in some measure as supplemental to those of Jacob and Balaam. He enters into many details of the perverseness and the corruptions of the Israelites, and the consequent calamities of famine, pestilence, and war, which should afflict them under the government of their kings. He states them almost with the simplicity of an historical narrative; while all other prophecies, except those of our Lord, are expressed in more poetical and in far more obscure language.

The 28th chapter of Deuteronomy contains several passages which are plainly indicative of the captivity of the ten tribes by the Assyrians, and of the two remaining tribes of Judah and Benjamin, by the Babylonians. In examining the books of Kings and Chronicles, we find that most part of those predicted judgments were fulfilled in the order he foretold; as in the dearths that took place, the plagues that carried off numbers of the people, and the repeated invasions of the country by the Moabites and Philistines, and afterwards by the Ammonites, Chaldees, and Syrians. The captivity of Jehoiachin by the Babylonians was a striking accomplishment of the prophetic threat in the 36th verse. 'The Lord shall bring thee and thy king which thou shalt set over thee, unto a nation which neither thou nor thy

fathers have known ;' for it was delivered long anterior to the establishment of any king. The conclusion of that verse, 'and there thou shalt serve other gods, wood and stone,' was also precisely fulfilled, as the people were compelled by their cruel conqueror to worship his idols.

The circumstantial prophecy contained in the last twenty verses of that chapter, was fulfilled most literally by the invasion of the Romans, the destruction of Jerusalem, and the complete dispersion of the Jews. The Romans were described in it with characteristic precision, eight hundred years before they existed as a nation. It is said that they were to come 'from far, from the end of the earth :' now the western parts of Europe were, at that time, the limits of the known world ; and it is remarkable, that the armies of Titus and Adrian were principally composed of Gauls and Spaniards. The rapidity of the Roman marches is compared by the prophet to the flight of the 'eagle,' and it is not too much to suppose, that in that expression he alludes also to the eagles which were the Roman ensigns. Their language was not to be understood by the Jews ; and the 'fierce countenance,' for which the Romans were distinguished from the earliest periods of the republic, is noticed, as well as the merciless ferocity of their conduct.

The horrors of the siege of Jerusalem are next foretold with dreadful exactness ; as well as the miseries the people were to endure in their subsequent dispersion. 'The Lord shall scatter thee among all people, from the one end of the earth even unto the other ; . . . and among these nations thou shalt find no ease, neither shall the sole of thy foot have rest.' 'Observe now,' said my uncle, 'the fulfilment of that prophecy. Since their calamitous expulsion, the Jews have wandered over the face of the globe for one thousand seven hundred years, without national possessions, government, or laws. Their riches have exposed them to plunder, and their poverty to contempt. Driven from place to place, they have been persecuted, even in Christian countries, with unrelenting cruelty ; they seem to have lost their rank in the creation, and have been made to feel the "trembling heart," "the sorrow of mind," and the uncertainty of their lives, of which their great prophet so emphatically warned them.

'Yet, notwithstanding their sufferings, they have been preserved a distinct people through all the changes of na-

tions; for the same prophet said, they should 'only be oppressed and crushed;' not exterminated and rooted out like the Canaanites. They have adhered to their religion, and retained the sacred language of the Scriptures; they appear to have been preserved for "a sign," and for "a wonder;" and they may be said to be the depositaries of the prophecies, the continued accomplishment of which is really a standing miracle of the most extraordinary and convincing nature.'

I am ashamed, dear Mamma, of the slight sketch I have given of what my uncle said at great length in answer to Wentworth; but, though I have done him very little justice, it has all made a deep impression on my mind, and I am going to read a book he has lent me on the comparison of the prophecies with profane history.

8th.—At last I have escaped from confinement, and am enjoying the delight of fresh air. Everything looks gay; the sweet flowers, the bright green shrubs, the butterflies flitting about in the sun-beams, and, above all, the unceasing singing of the birds. Oh, Mamma, how can you bear to live where you hear so few warbling birds?

The change that one short week has produced in my garden is quite magical; it is really a sheet of flowers; and I found there a new proof of the good-nature of my cousins, for they had pulled up every weed that disfigured it while I was confined to the house.

In my aunt's garden there is a tree of the Yulan Magnolia just opening its large tulip-shaped blossoms, which are so fragrant and of so pure a white. It is nearly twenty feet high, and it is so hardy, that she wonders this beautiful shrub is not more common in all gardens.

What a peculiar character the hawthorn gives the hedges in this country! It is called *May*, and indeed it is so pretty, that I think it deserves that honour.

'For thee, sweet month, the groves green liveries wear,
If not the first, the fairest of the year;
For thee the Graces lead the dancing Hours,
And Nature's ready pencil paints the flowers.'

I have been examining with my aunt the tendrils of the sweet pea; they are so generally found just in the right places for attaching themselves to some convenient support, that one would almost imagine they knew exactly where

to put out; but she pointed out some that were idle and useless. She then showed me the beautiful arrangement of nature by which the honey-suckle supports itself: when a straight shoot becomes long and weak, it curls into a spiral figure, which gives it great additional strength, even if alone, and enables it to take a firm grasp of any twig that it meets. But if two or more shoots should touch, they immediately twine or screw themselves round each other, like the strands of a rope, for mutual support.

Another fact my aunt told me on this subject is, that the clasps of briony always shoot forward in a spiral, in search of support; but if they meet with nothing, after completing a spiral of about three turns, they alter their course, and proceed in some other direction.

9th.—Caroline and I had a nice walk this morning with my uncle, and I hasten to write down the additional facts that we learned from him on the subject of fossil remains.

Shells, he told us, are generally found entire, and the skeletons of fishes are frequently discovered in such a perfect state, that both their families and species can be easily ascertained. But the fossil remains of quadrupeds are very rarely complete; some of the parts are wanting; the bones are either scattered at a distance from each other, or else lying confused together, and generally broken. Yet these misplaced fragments are the only means left for naturalists to determine the species of the animal to which they had belonged; and in frequent cases a single bone has been sufficient for that purpose. This is effected by the science of *Comparative Anatomy*, or, in other words, a comparison of the construction and the functions of the corresponding parts of the inferior animals, with those which belong to the human body; and perhaps no science furnishes more instances of ingenious observation and beautiful reasoning.

Every organized being forms an entire system of its own; all its parts have a mutual relation to each other; and each of them, taken separately, will, therefore, clearly point out the other parts to which it must have belonged. Suppose a ploughman turns up in a field a few bones—the only conclusion he can draw is, that some unknown animal had died near that spot; but the comparative anatomist can tell the size of the whole animal, its general form, the structure of its jaws and teeth, and, consequently, whether it belonged to the herbivorous or carnivorous tribes. None of these.

separate parts can vary their forms without a corresponding variation in the other parts of the animal; and, consequently, each of those parts, taken separately, indicates all the others to which it had belonged.

If the stomach of an animal is organized so as to digest only flesh, then the jaws and the incisive teeth must be constructed for devouring flesh; the claws for seizing the prey; and the entire system of the limbs for pursuing and catching it. Every one of those organs is indispensable in the structure of carnivorous animals; so that by the bones of the paw, or the arm, or the shoulder-blade, or the leg, the construction and disposition of all the rest may be determined; and, consequently, the whole form, species, genus, and class of animal must necessarily be discovered by the examination of a single bone.

The hoofed animals, it is plain, must be herbivorous, because they are possessed of no means of seizing their prey; it is also evident that their fore-legs, being only necessary to support their bodies and to assist their progressive movement, they have no occasion for any rotary motion in that joint that corresponds to the human wrist; and their food being herbaceous, their teeth must have flat surfaces; but at the same time, in order to bruise seeds and tough plants, the teeth are composed of alternate layers of hard enamel and soft bone; and a horizontal or grinding motion is given to the lower jaw, which for that purpose has a peculiar conformation of its joint. Again, we know that ruminating animals alone are provided with cloven hoofs, so that, from a simple foot-mark, we can be perfectly certain that the animal possessed such and such teeth, jaws, legs, shoulders, and horns; and that it fed on herbage.

The same laws and the same modes of reasoning, of course, equally apply to petrified bones, and in this manner seventy-eight different fossil quadrupeds have been ascertained and classed, of which forty-nine are of extinct species. It is remarkable, that oviparous quadrupeds are generally found in more ancient strata than the viviparous tribes. A few bones of marine animals, such as seals, are found in the shell limestone which immediately covers the chalk strata, but no bones of land quadrupeds have been discovered in that formation; they generally occupy the ancient alluvial beds composed of sand and pebbles which lie over the limestone.

Some species, which, though now extinct, belonged to families that still exist, have been found among the remains of the more ancient and unknown genera; but none of the animals which at present inhabit the earth are ever found, except on the sides of rivers, or at the bottom of marshes, or in the superficial formations; and though their deposition has been comparatively recent, their remains are always the worst preserved.

10th.—The plants which I placed in baskets in the pond have flourished so greatly, that I want to try the same plan with other plants of the same nature: my uncle laughs at me, and says I would put the whole contents of the conservatory into my pond; but indeed I only want to try a crinum, a pancratium, and one or two others. However, I shall confine my wishes now to an agapanthus, or African lily, because my aunt thinks that we shall be in Ireland at the flowering time of the others, and that I should not witness the success of my experiment. I have re-potted the agapanthus in a rich sandy compost, but I have only put the fibrous part into the earth: the whole of the tuber remains above ground. This is to be plunged to the rim in the pond, and the gardener has directions to watch its progress, if I should not be here.

Mary has had some plants of the *lobelia fulgens* in the conservatory for some time; they were planted in good strong loam, and the pots stand in saucers continually supplied with water; they have already grown amazingly, and will, I am sure, be five feet high before the flowers are out. But alas! we shall be away from this dear place when they blossom.

11th.—I had some confused idea that the great fossil animal, which is called the mastodon, was the same as the mammoth; but my uncle told me to-day, that though the remains of the mastodon have some general resemblance to the elephant, yet there is no doubt that they were quite distinct animals. The bones of the mastodon have been found in great numbers both in North and South America, but no complete skeletons have yet been put together. A small species of this animal has been discovered in Saxony, as well as in some other parts of Europe; and naturalists now divide the whole family into five species. The principal points of difference are not only the disposition and shape of the grinding-teeth, but the bulk of the animal; for the

sure, be so kind as to show it to you ; and I think you had better celebrate this famous day, by writing an explanation of this beautiful poem, now so little read.

' You may explain it, if you can, in the style of " Readings on Poetry ;" a very favourite book, you know, in this house. If any of the mythological allusions are not quite obvious, I will endeavour to explain them ; and I will now only premise that the poem proceeds on the Eastern idea that the year begins in May :

" For ever then I led the constant year,"

is therefore quite in character for

" The flow'ry May, who from her green lap throws
The yellow cowslip, and the pale primrose."

This was a terrific task, and occupied me great part of the morning. At last, when it was finished, I came to the hall to refresh myself with my cousins at a new play, called *La Grace*, or the *Flying Circle*, which we have lately imported, and the description of which will probably divert Marianne more than any learned dissertation of mine on the ' Tears of old May-day.'

Two people stand at opposite ends of the room, as in playing shuttlecock ; each holds two nicely turned sticks, one end of which is pointed ; and by a dexterous movement of these pointers, a light, elastic hoop, about eight inches diameter, is sent flying forward towards the person opposite, who catches it on her pointers, and immediately lets it fly back again. When played with two hoops it is still prettier, and requires much more expertness than shuttlecock.

Mary and I had played at it successfully for some time, when we were interrupted by poor little Grace, who, looking very sad, ran into the hall, put her pencil-case into Mary's hand and vanished, brushing away a large tear from her cheek.

Mary followed her, and afterwards told me that she had given Grace a silver pencil-case some months since, on condition that she never would again scribble in books ; a habit which she had unaccountably acquired. Grace, delighted to have her long-wished-for pencil-case, agreed to the compact, and punctually kept it till this unfortunate day. The moment that she recollected herself, she came to return the pencil to Mary, with true honesty indeed, for she had only

scribbled in one of her own little books, which might never have been observed. Though sorry that she should thoughtlessly have broken her engagement, yet all were pleased at finding that she had that fine principle of honour which disdains deceit. My aunt has certainly contrived to fix steady good principles in the hearts of my cousins, which really influence their conduct. Instead of having to watch them, she places the most perfect reliance on their integrity; and most justly, for I, who see them at all times, know that they have not mere show-sentiments or show-manners; but that they are just the same when not observed by their mother as when in her presence.

13th.—I believe I noted in my journal, that I had been practising the art of *budding*. As soon as I had acquired a little expertness, I tried my hand on various roses, just as the leaf-buds began to swell, having seen, in the 'Transactions of the Horticultural Society,' that period recommended as the best for roses. The April showers were of great use, and most of my buds have now become nice flourishing shoots. Yellow roses are said to thrive particularly well, when budded on the China-rose, and I hope mine may not be attacked by those troublesome little green caterpillars that ate away the heart of the buds on Mary's yellow rose last year. She kept one of them, which changed into a small brown chrysalis, and this morning it has become a very pretty buff moth, marked all over in brown patten work; it is small, but the antennæ are as long as the whole moth, circular and bowed towards its nose like cow's horns.

I have also several young rose *grafts* of different species growing on the wild rose—

'Of simpler bloom, but kindred race,
The pensive *Eglantine* ———.'

Mr. Biggs asserted that this process would improve their colours. I thought it rather extraordinary that the 'simpler bloom' of the wild rose should have that effect; but my uncle said, 'Try the experiment first, and reason about it afterwards.'

When I showed these budded roses to Miss Perceval, I expressed my surprise that amongst the numerous South American plants which have been collected in this country, I had not heard of any new species of rose.

'Are there any native roses in South America?' she asked.

'Oh! of course,' said I, 'in such a flowery country. You know there is an island in the Rio de la Plata, called the Isle of Flores, which I suppose is covered with flowers.'

'Can you describe any of your indigenous Brazilian roses?' said she, laughing.

After considering some time, I was obliged to acknowledge that I could not recollect any one that I knew to be a native of Brazil.

'This is one of the numerous instances of *taking for granted* which we meet every day,' said she. 'You imagined that the rose must be wild in all parts of the world because it is everywhere cultivated:—you will therefore learn with surprise, that it is generally believed that all the roses yet known have been found between the 19th and 70th degrees of north latitude; none, therefore, belong to South America, though the profusion of China roses, cultivated in Brazil, might very naturally have given you the idea of their being natives. It is possible, however, that hereafter new species may be discovered south of the line, which will come under the head *Rosaceæ*, for the industry of botanists has wonderfully increased this family in a few years. In Wildenow's book, published in 1800, he enumerates only thirty-nine species, yet there are upwards of one hundred now known and cultivated in this country; and a foreign professor has given a list of even two hundred and forty species. He proposes to divide them into twenty-four series, each of which is to bear the name of some botanist who has distinguished himself by a knowledge of that beautiful genus: for instance, *Rosa Candoliana*,—*Wildenowiana*,—*Pallasiana*, and so on.'

She told me also that all the apple and pear tribes are placed in the natural order of *Rosaceæ*: in the rose, the calyx, which is pitcher-shaped, incloses the germ; and in the former the germ is beneath the calyx. She mentioned, too, as a curious circumstance of the dog-rose or eglantine that the farther north it is found, the more woolly are the styles, while to the southward, as in Madeira, they have no hairs whatever.

The rose seems to be prized particularly in Persia, where it is the chief ornament of the garden. In that very entertaining book, 'Sketches of Persia,' the author mentions a

breakfast which was given to him at a beautiful spot in the vicinity of Shiraz : —

‘ We were surprised and delighted to find that we were to enjoy this meal on a stack of roses ! On this a carpet was laid, and we sat cross-legged like the natives. The stack, which was as large as a common one of hay in England, had been formed without much trouble, from the heaps or cocks of rose leaves, collected before they were sent into the city to be distilled.’

In Foster’s Travels, too, Mary showed me a description of the city of Kashmire, where the houses, though slightly built, have flat roofs of sufficient strength to support a covering of earth ; this is planted with roses and other flowers, and gives the town a very beautiful appearance. The earth also preserves the houses from being chilled by the quantity of snow that lies on them in winter ; and in summer it gives them a refreshing coolness. Every creature he met had roses in their hands ; and you may recollect, Mamma, that the same thing is said of the city of Bisnagar, in the Arabian Nights’ Tales. The province of Kashmire, Foster says, has been always famous for roses, particularly for one extremely fragrant species, of which the best attar of rose is made ; but it will not grow in a more southerly climate.

He mentions a lake, near the city, in which there were several islands covered with rose trees ; they were all in brilliant blossom when he was there, and looked like large baskets of roses. How pretty the floating Chinampas of Mexico would be, if they were planted with the Kashmire rose ; or, what would suit them better, with the little rose of Jericho. Miss P. says this is one of the most singular plants in the world, and is found nowhere but in the deserts of Arabia. It is only six inches high, root and all ; and its tiny branches curve inward, so as to inclose its numerous flowers in a sort of hollow globe. I think this may be truly called a Lilliputian tree.

WEEK 41.

The Song of Moses—Its Application—Formation of Peat and Coal—Cannel Coal—Curious Insect on a Pear Leaf—Moth—Pear Tree recovered by Water dripping on its Roots—Dame Moreland’s Cats—Cerealia—Feather-grass—Damp.

May 14th.—Sunday. The thirty-second chapter of Deuteronomy, or the Song of Moses, was the subject of our con-

ment in the hand of God, whose wrath had been so signally manifested against the Jews.

'The last part of this celebrated song is called the consolation of Israel: it holds out a gracious promise of future reconciliation when they should have repented of their obstinacy, and abjured the vain idols in whom they had trusted for protection; it gives an awful warning to their oppressors, that the day of account and of vengeance for them also will come; and the words in the concluding verse, "Rejoice, O ye nations, with his people," seem to have been cited by St. Paul*, to prove the future conversion of both Jews and Gentiles to Christ, and their mutual exultation in his then undivided kingdom.'

15th.—I seized an opportunity of asking my uncle some questions about the beds of coal in the forest of Deane, and I learned that the coal formation there is an irregular elliptical basin, occupying nearly the whole of the forest tract. It is ten miles long, and six broad; and all the strata dip uniformly to the centre of the basin. He showed me the extent of it on a geological map, which he has made of this county; and which marks in the prettiest manner all the principal strata. Each kind of rock has a particular colour, so that its extent is seen at a glance; and by a section at the bottom of the map, the dip or inclination of the strata, and the manner in which they lie on each other, are very distinctly shown. He made Caroline and me observe that we could trace on it the mountain-lime and old red sandstone (which inclose the coal-field) across the river Wye into South Wales: there, he says, they contain another coal district, of much greater extent; and he showed it to us in Mr. Greenough's beautiful geological map of all England. I should never have been tired of looking at these maps, if Caroline, who knew how little time my uncle could spare, had not asked him something about the origin of coal.

'Before I answer that question,' said he, 'we must have a little discussion on the nature of *peat*; a substance which seems to be very closely allied to coal, and which, there is no doubt, has been produced by the decay and decomposition of vegetable matter. There are different kinds of peat, therefore, according to the different kinds of plants of which it is composed and the different situations in which

* Romans xv. 10.

the process has been carried on ; such as marsh, forest, and marine peat. Some extensive bogs have been caused within the memory of man, by the decay and natural fall of forests, over which the *sphagnum palustre* and other mosses rapidly spread ; agricultural implements and various domestic utensils have been found under them ; and we may therefore assume, that as peat appears to be in the act of progressive increase, it belongs to an order of causes still in action. When examined, peat appears to be an entire mass of vegetable *fibres* : towards the surface they are nearly in an unchanged state, but in the middle the peat becomes more compact ; and at the bottom of a very deep and ancient bog, they are almost obliterated, the substance being dense and black, and having all the chemical characters of jet. In some instances beds of peat alternate with beds of mud or sand, which must have been deposited in the bottom of lakes, and in these cases they appear something like an incomplete coal formation.

‘ In a short time,’ continued my uncle, ‘ we shall have a better opportunity of studying this curious substance, if your interest in it continues, when we are in Ireland, as that island contains a greater proportion of bog than any country with which we are acquainted.’

‘ My interest in it, my dear uncle,’ I replied, ‘ is not very likely to fail while I have your kind assistance ; but as we are as yet in a coal country, perhaps you will tell us something of the formation or origin of that mineral.’

‘ There is no possible doubt,’ he said, ‘ that the general origin of coal must be referred to the vegetable kingdom ; and I began with peat, to show you how masses of vegetable matter may be collected in thick and very extensive beds, ready for whatever process nature may afterwards employ in converting them into coal. Some species of coal are merely fossil wood (or *lignite*) impregnated with bitumen : the branches, trunks, and roots, though closely pressed together, are scarcely altered in texture in some places ; while in others they gradually lose every vegetable feature, and the substance, in colour, lustre, and fracture, resembles pitch. Of this nature is the Bovey coal of Devonshire, and the Surturbrand of Iceland ; and I have some specimens of the former, in which the fibres were flexible when I took them out of the pit, though now hard and brittle. From

the disposition of those Bovey lignites, which lie in alternate strata with clay and gravel, it has been reasonably inferred, that the trees and vegetables of the adjacent mountains were washed down at different periods into a lake; the clay and gravel, of course, sank first to the bottom, and formed the floor; but in time the trees saturated with moisture, and, pressed down by an accumulation of other trees, sank also; and were again, perhaps in succeeding ages, covered by successive depositions.

‘The common, or cubical coal, as it is called from the shape into which it breaks, does not bear the same obvious marks of vegetable origin in its structure; but where one species of coal can be so clearly demonstrated to be only altered vegetable matter, it would be bad philosophy to ascribe the other species to other causes. In the prodigious beds of coal, however, in Staffordshire, there is no want of vegetable traces; and even in the Newcastle coal the impressions of leaves and branches are frequently found, as well as in the freestone and slate-clay which intervene between its numerous strata. At Kilsyth, in Scotland, a very singular specimen was discovered; a tree standing upright, with its roots resting on a bed of coal, from which they could scarcely be distinguished, and its stem passing into a stratum of sandstone rock. The lower end was completely bituminated, and it burned with a clear flame; yet the upper part, though scarcely altered in the grain or apparent texture of the wood, was converted into sandstone similar to that by which it was inclosed. Round the stem there was a space of about an inch in thickness, filled with coal, which renders it probable that the same process that converted the roots into coal acted upwards on the bark. The rock contains innumerable remains of plants; some of which are so perfect that their species have been made out, and no pencil could trace their delicate ramifications with greater nicety.

‘In short,’ continued my uncle, ‘it appears more than probable, that every species of coal has proceeded from vegetable matter of different kinds, but under different circumstances; and that its chemical change was effected under the pressure of deep water. In one stage of that process it must have been in a soft pulpy state, like the lowest part of a deep peat-bog; for this is the only way

that I can account for the impression of leaves, canes, seed-vessels, and shells, which are so commonly found on the external surface of coal.'

My uncle showed us a beautiful specimen of a fern leaf, where the impression was as perfect as if it had been made with wax.

He then continued, 'Sir James Hall thinks that peat may have been converted into coal by heat acting under great compression; and he has actually succeeded in making a substance very like it. When I have more leisure I will describe the ingenious process which he adopted, as well as some other experiments of the same nature, by which this distinguished philosopher discovered the means of fusing limestone, of imitating volcanic lava, and of forming solid sandstone from loose sand.

'But to return to our coals: the chief difference between the various kinds of coal which are applied to economical purposes, arises from the proportion of bitumen they contain. What is called *caking coal* yields about 40 per cent.; when burning, it swells, agglutinates, and emits much smoke and gas, which inflame at a certain temperature. *Cannel* coal has only 20 per cent. of bitumen, and does not agglutinate or cake. It burns with a bright flame like a candle, from which circumstance it takes its name—cannel being the common pronunciation of candle in the north of England. The third sort I shall mention is called *anthracite*, by mineralogists; but its common name is *blind coal* or *Kilkenny coal*, from a district in Ireland, where there are vast beds of it. It contains little or no bitumen; it neither cakes nor flames, and gives out very little smoke. But as there are several varieties of coal between those principal species, much confusion has taken place in their names.'

16th.—When Mary and I were in the garden to-day, I observed a very odd appearance on the under surface of some of the leaves of a pear-tree; they appeared thickly set with strange little downy russet-coloured things, like spines, growing out of the leaf, perpendicular to it, and about a quarter of an inch in length, and very little thicker than a pin, with a protuberance or excrescence at the base.

Mary was amused at my surprise, and told me that they were the habitations of insects. She then took one of these tubes off the leaf, and on giving it a gentle squeeze, a mi-

nute caterpillar, with a yellowish body and black head, came out of the lower end; for the head is always downwards. We examined the place from which she had removed it, and I saw that there was a small hollow in the outer skin and pulpy part of the leaf, which had been eaten away by the caterpillar. It moves this little tube or tent from one part of the leaf to the other, and eats no other part than what the tent covers; and when these insects are abundant, Mary says that every leaf is covered with little withered specks, where they have feasted themselves.

The tube in which the caterpillar lives is composed of silk, spun from its mouth almost as soon as it comes out of the egg; and as it increases in size, it enlarges the tube by slitting it in two, and introducing a strip of new materials. To preserve the perpendicular posture of its tent, this ingenious insect attaches several silken threads from the protuberance at the base to the surface of the leaf; but it has a still more singular device to protect the tent against any violence; it forms a vacuum in the protuberance at the base, which fastens it to the leaf as effectually as if an air-pump had been employed. This vacuum is caused by the insect's retreating, on the least alarm, up the tube, which its body so completely fills, that the space below is free from air, and the tube is pressed down like the exhausted receiver of an air-pump.

Mary easily convinced me of this when she seized it suddenly while the insect was at the bottom; the silken cords readily gave way, and the tube was detached by a very slight force; but when she touched it gently, giving the insect time to retreat, we found that a much stronger effort was required to loosen it. As if aware of the effect of the admission of air from below, this little philosopher carefully avoids gnawing quite through the leaf; and when he has eaten as deeply as he can venture, he cuts the cords of his tent, and pitches it on a fresh part of the surface. When it has attained its perfect state, it becomes a small brown moth.

17th.—Mary had been trying a grand experiment, which has succeeded so well, that Mamma must have an account of it.

My uncle determined to remove a valuable jargonelle pear-tree from one wall to another. I forget his reason, but no matter; it was, however, much too late in the season, and

the tree sickened, and seemed to be dying. The gardener declared it could not live; but Mary, who had read that trees in such a predicament might be saved by a gentle but continual drip of water being guided to the roots, requested my uncle to let her try the effect of this plan. He is always anxious to encourage useful experiment, and willingly consigned the tree to her prescriptions.

She took two large flower-pots, and, having carefully corked the holes, she suspended one to each end of a stick, which was fastened across the stem of the tree. A piece of cloth-listing or selvage, long enough to reach the ground, was put into each pot, with a stone tied to it to prevent its slipping out; and the other end of the listing was slit into three parts, which were slightly pegged into the ground. She then had the pots filled with water, and the whole of the listing being wetted, each of them acted like a syphon, drawing the water up over the edge of the pot, as my uncle says, by capillary action, and conducting it slowly and regularly into the ground. The moisture spread to the roots, and in three days the young leaves began to revive. The pots were filled every morning, and she changed the listing once a week, as the filaments of the cloth became clogged, and the water was not so freely transmitted. The daily improvement of the tree was very gratifying to my uncle, who enjoyed Mary's ingenuity and success; and even the gardener has this morning pronounced it to be out of danger.

18th.—I am afraid that my dear Mamma will call me a little credulous simpleton, when she reads this account of the singular sagacity of a cat; but my aunt took great pains to ascertain that it was quite correct.

Dame Moreland has some remarkably fine cats, and she is in the constant habit of drowning all their progeny, except one kitten of her favourite, Mrs. Snowtip's, which she selects with due attention to its beauty. This time, however, pussy thought proper to choose that one for herself, and carrying it from the garden into the house, she left the rest to perish. Accustomed to their being regularly taken away, she seemed to agree to that arrangement, and devoted herself to the one she had saved.

A few weeks afterwards another of the cats kittened; and its whole brood being destroyed, the poor thing became very uneasy, and suffered much from the want of her little ones to relieve her of the nourishment provided for them. On

which, the fat Mrs. Snowtip being very ill-supplied herself, actually employed the poor bereaved cat as a nurse. This office she performs with proper fidelity, and the two ladies agree perfectly; for while the nurse feeds little Snowtip, the mother smooths and dresses it herself, and, on any alarm, flies to its protection, while the nurse seems contented with doing her own duty, and never interferes on such occasions.

19th.—I have had a good deal of work at my strawberry-bank, for Mr. Biggs warned me that the beds ought never to be dug, but constantly hand-weeded; and he recommended, also, that the runners should be nipped off as soon as they appeared. I undertook to do all this myself; and both weeds and runners seem determined that I shall not be idle.

This strawberry-bank is such a very dry soil, that I found the plants wanted water continually; and I asked my uncle to let a little channel be made, for the purpose of bringing to the top of the bank a small rill that runs across the back of the shrubbery. Something I had heard about *irrigating* meadows suggested this idea, and my uncle approved. The channel has been cut, and it brings the water on a level along the upper edge of my bank, from whence it trickles down the slope along each row of strawberry plants. When they have had enough, I put a slate edgewise across the channel, which acts as a little sluice, and turns the water aside into the pond. This method of watering has so far answered very well, for I think my strawberries look more healthy than any of the others; they are now in full flower, and I am in high hopes of having the first and best fruit to present to my uncle for his kindness.

20th.—I had a long walk, yesterday evening, with Miss Perceval and Mary, through some of Farmer Moreland's fields, which are shut up for meadow. The grasses are opening their blossoms, and Miss Perceval taught me the names of several that I had not known. She then asked me if I could describe the leading characters of the grass family.

I considered, and hesitated, and tried; but my attempts were very awkward, and I acknowledged that trials of this sort were sometimes exceedingly useful in making us acquainted with our own ignorance. She smiled, and put the same question to Mary.

Mary said, 'I will do my best, but on condition that you will tell me where I am wrong. The stem is generally smooth, and its hollow cylindrical form enables it to stan

upright, even when four or five feet high ; it is usually jointed which gives it additional strength ; and it is terminated by the flowers, which are either tufted, or in spikes, or paniced : —the leaves are alternate, and always undivided—one of them springing from each knot, and enveloping the stem with a sheath, which is split down to the knot. All grasses have a chaffy flower inclosed in a glume or husk ; and each flower has a single seed. These are all the general characters that I can recollect, which mark the tribe distinctly.’

‘Very clear indeed,’ said Miss Perceval, ‘and quite full enough. The grasses are easily distinguishable from all other plants, except the Cyperacea ; and even they show a well-marked line of separation, as their stems are sometimes triangular, and very seldom jointed ; and the sheath is always entire, not split, like that of the grasses.’

‘The grasses are of the greatest importance,’ she continued, ‘in the economy of nature ; they form, in most countries, the chief covering of the earth ; they are the principal support of terrestrial animals ; and you know that the basis of all agriculture is the cultivation of plants which belong to their order.’

Miss P. easily allows herself to be drawn out, and before we reached home, we obtained the following particulars of that numerous family.

‘There are about eighteen hundred species already known ; and the industry of botanists is every day adding to the list : there are both land and fresh-water grasses, but no marine grass. They occur in every soil ; generally in society with other grasses, but sometimes a single species will be found occupying a considerable district. Sand appears the least favourable to their growth ; but even sand has species peculiar to itself. They are spread over the whole vegetable kingdom, from the equator to the polar regions ; and from the sea-shores to the tops of the highest mountains, at least to the line of perpetual congelation.

‘We are still in want of a perfect natural classification, by which their distribution on the globe might be made more distinct : at present, each of the ten groups into which they are arranged, contains too many, so that not one of the groups belongs exclusively to any one zone. Some, however may be regarded as tropical, and some as chiefly inhabiting the temperate climates. The variation of the grasses in the different continents is still less perceptible ; there is scarcely

any difference between those of North America and those of the temperate regions of the European continent. Between the two temperate zones, also, the distinction is inconsiderable. Of thirty-six species from the Cape, thirty occur in the northern hemisphere; while in other tribes of plants, Southern Africa has many that are peculiar to itself. I may mention *poa* as being one of the most extensively distributed genera; some of its species are found in every part of the world, from Spitzbergen to New Holland.'

'We may say then,' said Mary, 'that latitude has but little influence on these plants.'

'Yes, it has a decided influence,' said Miss Perceval, 'on their vegetation; the tropical grasses acquire a much greater height, and almost assume the appearance of trees. Some species of the bamboo, which you know belongs to this tribe, are fifty feet high. The leaves too are broader, and approach more in form to the leaves of the other families of plants.'

I then asked Miss P. to give me some idea of the distribution of those grasses which are cultivated.

'The cultivated grasses,' she said, 'which extend farthest to the north in Europe, are barley and oats. These, which in milder climates are not generally used for bread, afford the inhabitants of Norway, Sweden, and Scotland their chief vegetable nourishment. Rye comes next to these; it is the prevailing grain along the borders of the Baltic, and in part of Siberia. Next follows a zone including Europe and a large part of Western Asia, where rye disappears, and wheat almost exclusively furnishes bread.'

'The next district extends across Barbary, Egypt, Persia, and the countries of the East, where, though wheat abounds, rice and maize are extensively cultivated; and in some of those countries the sorghum, which yields a grain resembling millet, and the *poa Abyssinica*, are largely used by the inhabitants. In the eastern parts of the temperate zone, including China and Japan, rice predominates over all other grains. Between the tropics, maize prevails in America, rice in Asia, and both in nearly equal quantities in Africa; probably because Asia is the native country of rice, and America of maize. The native country of wheat has not yet been ascertained, but there are few places into which it has not been introduced. Several other grains and plants that supply food, are cultivated in the torrid zone, but we cannot touch on them now, as they are not grasses.'

'In the highlands of South America, there is a distribution similar to that arising from difference of latitude. Maize is not found beyond the height of six thousand feet; from thence to nine thousand feet the European grains abound, advancing upwards in this order; wheat, then rye, and then barley. The larger esculent seeds of the grasses were named, by Linnæus, *Cerealia*, from Ceres: he included rice, wheat, rye, barley, oats, millet, and maize.'

This morning we were talking over all we had learned yesterday from Miss P. about the grasses, when my uncle invited us to his study, and showed us some dried specimens of feather-grass which grows in Europe, and is larger and more curious than the pretty little species that you have in Brazil. The feather is six inches long, with a kind of a spiral form at the lower end, which twists or untwists according to the degree of dampness in the atmosphere. We held a piece of it over the urn at tea, by which it was instantly put in motion, so that it would make a very nice hygrometer. I wish I was acquainted with Harry and Lucy, and I would send them the bit my uncle gave me. Miss P. says that, as the seed ripens, the flower closes over it into a sharp point; and that, as the stalk is slightly barbed, it works its way into the ground by the effect of damp acting on the twisted part.

WEEK 42.

Patriarchal, Levitical, and Christian Dispensations—Expiatory Sacrifice—Visit to Gloucester—Pin Manufactory—The Cathedral—Gothic Architecture—Cliff Swallows of America—Mason Wasp.

May 21st.—Sunday. I asked my uncle this morning to explain what he meant by the Levitical dispensation, and by the New dispensation, to which he has so frequently alluded.

'I will with pleasure, Bertha,' said he. 'It gives me great satisfaction to perceive that you reflect on what you are told. Never allow yourself to be contented with half knowledge.

'You know that, in consequence of the Fall of man, a system of divine grace for his redemption was promised by the Almighty; and that it commenced with the mysterious promise, that the seed of the woman should bruise the head of the serpent. But as things in the natural world are only permitted to reach perfection gradually, rising from infancy

to maturity, so it is likewise in the moral world; and this gracious scheme of mercy, instead of being at once displayed in its full extent, was gradually unfolded at different periods, until the promised seed was at length manifested in Jesus Christ. These successive communications have been called dispensations, because the knowledge of God and of his merciful intentions were *dispensed* or revealed by them. There have been three of these dispensations—the Patriarchal, the Levitical, and the Christian; but they belong to the one system of Providence, and are all linked together, the redemption of the human race being the beginning and the end of the whole. The proper modes of worship were at the same time distinctly ordained; and, however different the institutions which were severally dispensed may appear to us, we may feel assured that each of them was peculiarly adapted to the moral state of the world when it was promulgated.

‘During the term of the patriarchal dispensation, which comes first in order, it pleased God to make known such a portion of his will, and to dispense throughout the world such a degree of knowledge of his purposes, as would have been abundantly sufficient to have conducted mankind to heaven, if they had not wilfully resisted the benevolent offers that were made to them, and turned aside from the easy path of duty that was prescribed. The patriarchal dispensation was evidently intended to be *universal* in its offers, as well as in its conditions; for Adam would of course communicate to the numerous generations of his children, with whom he was contemporary, the knowledge, which he had himself derived from direct revelation, of God’s gracious will and intentions. But this universality was of short duration. Animal sacrifice appears to have been appointed as a type of that mighty sacrifice or atonement by which mankind were to be enabled in the fulness of time to triumph over their spiritual enemy; and the conduct of Cain in rejecting it produced an immediate distinction between the servants of God and those who were seduced to follow the principles of his apostacy. The terms on which that general atonement had been offered were neglected; the reconciliation of fallen man by means of the promised seed was slighted, and the lamentable corruption which spread amongst the early inhabitants of the world led to the awful judgment of the Deluge

‘Thus ended the first period of the patriarchal church

It was renewed in the descendants of Noah, and for a long period retained its original character of universality, till other apostacies took place. These, however, were of a very different nature from that of Cain. The occasional appearances of a superior race of beings, ministering under a human form between God and his creatures upon earth, probably led to what has been called Hero-worship. Surprising as this perversion may appear among people whose immediate ancestors had the singular advantage of direct communication with the Supreme Being, it seems to have taken deep root in the human mind; for, in the most enlightened nations of antiquity, we find a continual disposition to look back on departed heroes and conquerors, not only with a sort of pious veneration, but even to consider and address them as tutelary deities. Always prone to be led away from the plain and simple truth, human weakness found another early source of corruption in the worship of the heavenly bodies: their splendour, and their obvious influence on all the pursuits of mankind, produced a superstitious reverence, which by an easy transition degenerated into adoration; and it has been remarked, that in the early records of almost every country we find that the sun and moon were regarded as deities, and that fire was the constant emblem under which they were worshipped.

‘The prevalence of these idolatries after the Deluge may be inferred from various passages in the Scriptures, and particularly from the direct prohibitions contained in the laws that were given to Moses. But amidst all the depravities and abuses that had thus disfigured the patriarchal religion, the belief in the necessity of expiatory sacrifice was constantly maintained; and though the horrid corruption of that tenet gave rise to the sacrifice of human victims, there is no doubt that they dimly shadowed out a general belief in a future divine victim. Thus you perceive that, revolting as all these impious corruptions were, yet they had for their original foundation the very principle of the system of atonement and redemption—that “without shedding of blood there is no remission of sins.”

‘The consideration of the other two dispensations we must defer, my dear Bertha, to another opportunity.’

22nd.—Mary and I went this evening in search of the moth of the little pear-leaf caterpillars: we shook a gooseberry-bush, and numbers of them came forth. They fly in

the day-time, never going far at a time, and cautiously conceal themselves in the nearest bush.

This little (*seratella*) moth is of a brownish colour, with numerous black dots and stripes on the fore wings, which are beautifully fringed with feathers. The inferior wings are very small, and have also a fringe on the margin. This moth is particularly distinguished by the extreme length of the hind feet; they are twice as long as the body, and are thought by some to act like a pair of oars in regulating their flight, and in helping to maintain the body in equilibrium.

My aunt told me that some years ago the depredations of this insect were considered as a species of blight; and the insect was so little known, that no description of it was to be found in either French or English entomologies. She believes that every blight that affects our fruit-trees is produced by insects, whose visits are encouraged by certain dispositions of the atmosphere. The germs of the future race are lodged ready to be called into existence whenever the weather be favourable to them. The cure then must be to eradicate the germ, but this can only be known by tracing the habits of these minute creatures. 'What a field,' added my aunt, 'for exercising the industry and observation of young people; and not only in acquiring knowledge, but in turning that knowledge to useful purposes!'

24th.—We accompanied my aunt and uncle yesterday in a very pleasant expedition. We boated to Elmore early in the morning to breakfast with Mrs. Maude, and heard some very entertaining letters from her daughter, which she was so kind as to read to us.

Miss M. has been in town for three weeks, and the friends she is with have made great exertions to show her everything interesting. In the midst of all her hurry, however, she has written constantly home, describing all she does, and sees, and thinks, that can interest her father and mother. She was not very fond of early rising; but now, in order to prevent anything from interfering with these letters, she has the resolution to get up and write them before her friends' breakfast hour. She has almost excited my envy by her repeated visits to the British Museum—to galleries of beautiful paintings—to botanic gardens and stoves—to collections of beasts, and birds, and insects,—to tunnels and suspension bridges, and to all sorts of curious machinery; and she has had the great advantage, too, of having seen all these things

in company with people who could explain them to her. Alas! such things can be found only in London.

After we had heard these letters, we went on to Gloucester, where I had not yet been; and though it was not London, I had the pleasure of seeing a great deal that was quite new to me, and very interesting.

The pin manufactory we saw in every part, from the straightening the brass wire before it is cut into the proper lengths, to the last operation, by which the pins are whitened. But as Marianne will find all the particulars detailed in the Book of Trades, I will only say, that the thing which seemed to show the most expert fingers, was the putting the pins into the heads, and riveting them by a slight blow on an anvil. This is done by children, who take the heads out of an iron pot in which they have been heated, and instantly pop the bits of wire into them; and the never-failing exactness with which it is done is really wonderful. My uncle afterwards told us that a patent has been lately obtained for a very ingenious improvement, by which the head is raised upon the wire itself, so that the whole pin consists of a single piece of brass.

The sticking the pins into the papers, which are folded and placed against the edge of the bench, is also very curious. And when I recollected the great variety of people who had been employed in preparing the materials, from the time the metals were dug out of the mine till the wire was drawn, along with those whom I had just seen engaged in the different operations in this manufactory, I could not but feel astonished that one small article of female dress should cost such accumulated labour.

We then walked to the cathedral. What a magnificent building, Mamma! the twelfth part of a mile in length, and more than two hundred feet high. As to the interior, it is grand beyond anything I can attempt to describe, but you must remember it too well to make that necessary.

I will mention, however, a curious circumstance that my uncle told me as we were passing among the monstrous pillars of the nave: an attempt was made not very long ago to reduce them in size, or to chisel them into cluster columns; but they were found to be only hollow cases of masonry filled with loose stones. I could not help feeling glad that it had failed, for the contrast of their heavy, solid appearance, with the light elegance of the cloisters, I think improves each other. The choir is beautiful; and often as my aunt and

uncle had seen them, they could not help stopping to admire the carved work and tracery of the stalls.

This fine cathedral was begun in the eleventh century, the cloisters were added in the fourteenth, and the west front was not completed till the fifteenth. My uncle took the opportunity of showing me the different styles of Gothic architecture belonging to those periods; and on our road home, he explained the principal distinctions between the Saxon, Norman, and English styles, and the gradual alteration of the circular, sharp-pointed, and flat arches. The subject was entirely new to me, but I felt so much interest in it, that he has promised hereafter to go through a little course of architecture with me, from the Egyptian and Grecian to the Roman and Gothic.

25th.—We were talking to-day about the impressions of plants perceptible in coal, and I asked my uncle to tell me what plants they were. He referred me to Miss Perceval, who says that it appears from the researches of several German botanists, and particularly from those of Dr. Martius, that some of the Brazilian plants, which are so familiar to us, dear Mamma, seem to have such a resemblance to those impressions, that there can be scarcely a doubt of their identity.

‘The tree ferns,’ she said, ‘exhibit several characters in common with those ancient plants; one species in particular, the stem of which having a remarkable *tesselated* or chequered appearance, exactly represents some of the petrified forms found in the German coal mines. Dr. Martius describes ten different kinds of fern found in coal, each distinctly marked by some of those peculiarities which distinguish the living plants.

‘As very numerous examples of the arborescent as well as the herbaceous ferns occur in the coal formation, it can scarcely be doubted that this order of plants was formerly much more numerous than it is now; and that the forests of the primitive world were abundantly stocked with them.’

‘That is the more probable,’ said my uncle, ‘as there is reason to suppose that ferns were among the first plants that spread over the surface of the globe, and that they were the basis of a more general vegetation, by preparing the ground for others—their large fronds probably deriving as much nourishment from the atmosphere as from the earth; while their annual decay rapidly increases or improves the productive soil.’

'I do not mean, however,' said Miss Perceval, 'that the antediluvian woods consisted entirely of ferns; for the remains of many other plants, and of some large trees, are found mixed with those of fern—just as the living woods of the equinoctial regions, though very rich in ferns, consist of a great variety of plants of all sizes. Several specimens of palms, and of bambusæ, have been discovered; and the cactus is another tribe which appears very abundantly amongst these petrifications.'

'And I believe,' said my uncle, 'that the remark I made respecting ferns may be repeated of those tribes,—that they are furnished with a singular structure of organs adapted for respiration, and thereby for inhaling nutritious juices from the atmosphere.'

'Yes,' said Miss P., 'Saussure found that a single leaf of the cactus opuntia inhaled four cubic inches of oxygen in the course of a night from the atmospheric air in a glass vessel, in which he inclosed it; and we may, therefore, consider those tribes, and the yuccæ, and lychnophoræ, which flourish in a dry sandy soil, as the pioneers of vegetation, and intended by Nature to inhabit the rude wastes of a new world.'

After some further conversation on this subject, my uncle said, 'As the delicate parts of any vegetable substances would be entirely destroyed if transported to a great distance by floods, it is evident, that those plants whose remains are found well preserved in a fossil state, must have been inhabitants of the countries where the strata were formed. This consideration has given rise to many interesting speculations on the former climate of Europe, and its apparent changes; but if mammoths and elephants were clothed with fur to enable them to endure a Siberian winter, why may we not suppose that there were also species of palms and tree ferns suited to our temperate regions? Another curious inference may be drawn from the examination of vegetable remains: those found in what the German mineralogists call brown coal, exhibit in their wood, in their fruit, and their leaves, sufficient proofs of their belonging to indigenous, or, at least, to modern races of plants; while those which occur in what is termed black coal are all unknown or exotic: there can be no doubt, therefore, that those two coal formations belong to two very different ages of the globe.'

26th.—I still find a great deal of amusement in watching

my little family of swallows. They are unwearied in collecting food for their young; skimming through the air from morning till night, and darting on their prey with the most sudden turns. They catch knots and flies, and consume an astonishing number of mischievous grubs; and I am told they often accompany people on horseback through the fields, in order to pick up the flies which are roused from the turf by the horses' feet.

They never touch seeds; insects are their only object; and according to the weather, or the degree of warmth, they sometimes skim along the surface of the ground, and sometimes fly at a great height. When there is a scarcity of insects, they have been known to snatch the flies imprisoned in a spider's web, and sometimes even the spider itself.

Another species arrived soon after the chimney swallow, which, I believe, I have already described to you. It is called the house martin, or window swallow; but there is no end to the number of names given to this bird. It is very like the chimney swallow, but it has no spots on the tail, and its feet are differently formed, for it has the power of turning the hind toe forwards, in order to cling to a wall. This species are chilly little creatures: when there is a cold wind or rain, they press close to one another, and are sometimes so benumbed as to be caught by the hand.

It is said that, after they arrive here in April, they play about for nearly a month before they begin their nests. Sometimes they build in the cliffs and rocks that hang over water; sometimes against a perpendicular wall, without having any support underneath the nest; and they show great sagacity in their mode of carrying on their work. While laying the foundations, they not only hold on by their claws, but they fix their tail against some little projecting roughness in the wall, to serve as a kind of prop; and then with their bill they carefully cram mud and bits of straw into the smallest chinks in the face of the brick or stone; and to give those materials time to harden, preparatory to a fresh layer, the prudent little mason only labours early in the morning, so that his work dries sufficiently in the course of the day. I have got up several times at day-break, to see how nearly he uses his bill as a little trowel, while he carries the mortar or clay in one of his feet. About half an inch is laid every morning; and in ten or twelve days a hemispherical nest is thus formed, with an aperture at the top. The

shell or crust is covered with rough knobs of earth; the middle is strengthened by the intermixture of straw; and the inside is nicely lined with grass and feathers, or sometimes with moss and wool. If by any accident the nest should be destroyed, it is rebuilt in a short time by the active help of many individuals, who unite to assist their distressed companion. For several mornings they persisted in rebuilding a nest at the passage-room window, which had been purposely torn down each day; but at last, after a hard struggle, they gave it up.

I understand that the *cliff* swallows of America—who place their nests close up to the jutting ledge of a rock, or to the eave of a house—most ingeniously arch the top, and make the entrance project out and turn downwards. Frederick, who mentioned that circumstance at dinner, very philosophically remarked that, while the population of Europe was steadily extending itself from the eastern shores of America to the western side of the Mississippi, those cliff swallows were as resolutely advancing in a contrary direction. ‘It appears,’ said he, ‘from C. Buonaparte’s “Ornithology,” that in ten years they had gradually established themselves in Kentucky and Ohio; in 1817 a single bird was seen skimming round a tavern, near Lake Champlain—the next year, seven were observed there—the third year, twenty-eight—and in 1822, no less than seventy had arrived in April, which is the usual time of return from their migratory travels.’

The common sparrow sometimes seizes on a swallow’s nest before it is completed; and having driven away its owner, adapts it to his own use; but such invasions are often repelled, after a spirited contest. This act of piracy has been frequently seen; but my aunt is inclined to doubt the truth of another story, though related by Linnæus, of a sparrow who took possession of a martin’s nest, and obstinately resisted the united efforts of a group of these birds which had come to the aid of the owner; but at length they immured the intruder by building up the entrance with the same kind of mortar of which the nest was composed.

I can see the little swallows sitting all day with their heads out of the nest near my window, gaping for their parent, who comes frequently to them with food, and clings to the edge while they gobble it up; and I understand, that after they begin to fly, they are fed by their parents on the

wing. I have watched for this, but could not perceive it—they are so quick in every movement. As soon as the first family are able to provide for themselves, they quit their home, and while they are sporting about, and clustering and hovering round every building in the neighbourhood, the mother repairs the nest for a second brood.

27th.—The spring is now rapidly changing to summer, and the opening buds and unfolding leaves have been succeeded by a profusion of young branches and flowers. It is, indeed, very different from the rich luxuriant spring of your Brazilian climate; but, on the other hand, we have not here the perpetual rain, and the oppressive closeness of that season. The freshness of the air, the fragrance of the flowers, and the sweet song of the birds are all delightful; and every day I see some new and pretty insects. Though these insects are not quite in such numbers as Humboldt says appeared by turns, each at their different hours, on the Amazon river, still one may say—

Ten thousand insects in the air abound,
Flitting on glancing wings that yield a summer sound.

Just as we were looking at an uncommon butterfly to-day, Mr. Maude paid us a visit; and seeing how we were occupied, he told us that, when travelling in Switzerland last June, he witnessed a very curious circumstance, in the Canton de Vaud—an emigration of butterflies. He happened to perceive something flying past the windows, and on looking out he discovered an immense flight of butterflies crossing the garden. He immediately went out, and found that they belonged to the species called, in French, *La belle Dame*; they were all going in the same direction, exactly from South to North, turning neither to the right nor left; people moving about the garden did not frighten them; nor were they even tempted by the numerous flowers there to alight. Their flight was low and steady, but extremely swift; and it continued in a column of several feet broad for more than two hours. As Mr. M. afterwards learned that these butterflies had been remarkably abundant near Turin, in April and May, he supposes that they had emigrated from Italy; but, he says, naturalists have been greatly puzzled to account for their having done so in body, because they do not belong to those species that live in societies.

He mentioned another singular circumstance. When he was on Mount Etna, he saw, to his great astonishment, an immense number of insects hovering over the dry lava of one of the old craters; there was no appearance of vegetation, or of anything that could supply them with food; but there they were in a thick mass, flitting about in the sulphurous vapour, which still rose from the crevices. The insect was a species of bug, or *cimer*.

Frederick took me this evening to a sunny sand-bank, to show me a great novelty, which he had discovered there; the nest of the *mason wasp*. It is not common in England, and has never been found in this part of the country before. The nest is a round cavity, from two to three inches deep, which the insect bores through a hard sandy soil; and instead of throwing away the sand, as it is dug out, the little mason, by means of a glutinous fluid, forms it into oblong pellets, and arranges them round the entrance of the hole, so as to form a sort of cylindrical tunnel, which sometimes, Frederick says, is about two inches long. These little pellets are so nicely attached to each other, with regular spaces at the corners, that they have quite the appearance of filagree work. It is said that the use of the tunnel is to prevent the incursions of ichneumons and other artful insects, who are always on the watch to intrude their own young, and who are perhaps deterred by the artificial look of this entrance. One egg only is placed in the nest; and along with it are stored, as food for the future young, several fat grubs. But these are always full-grown, because, as they are just about to pass into the pupa state, they require no food for themselves.

Frederick opened the nest; and we examined it without fear, because the mason wasp having deposited its egg, and supplied it with food, does not remain to guard it. We found twelve grubs closely packed; each of them being coiled above the other in a succession of rings, and the earth so pressed on them as to prevent their movements from injuring the egg. The remainder of the hole was filled up with some of the pellets that I have already mentioned.

WEEK 43.

Object of the Levitical Dispensation—Imagination—Abstraction—Fancy—Swallows in the Mediterranean—The Palm Tribe—Caoutchouc—Water-proof Cloth—Mirage in Canada—Perpetual Fires near Coal Mines

May 28th.—Sunday. This morning my uncle proceeded to explain the Levitical dispensation. He began by reminding us of the gross corruptions, which had again crept into the Patriarchal dispensation, notwithstanding the awful warning of the flood.

‘But,’ said he, ‘even in those corruptions the main principle of that dispensation was preserved; that principle which marked the fallen state of man, and to which every hope of future pardon was necessarily attached. Instead of rejecting that doctrine of the Atonement, and the hope of the promised Deliverer, the apostates of that age made those points the very basis of their heresy. Their creed was built upon the necessity of expiatory sacrifices; and though they impiously divided and multiplied their herogods at pleasure, still each remotely signified the predicted seed of the woman supposed to be corporeally manifested in this or in that illustrious human character. The Almighty, however, had declared that there should not “any more be a flood to destroy the earth.” In his merciful councils other means were adopted for counteracting the evil, and for reclaiming mankind from a depraved polytheism, in which the true belief would be altogether lost; and with it the only means of ultimate reconciliation. The Patriarchal dispensation was no longer suited to this altered state of the world, nor sufficient for this gracious purpose; it was, therefore, to be superseded by a new and intermediate dispensation, which should strongly inculcate the doctrine of the Divine Unity, and perpetuate and confirm, with unceasing light, from time to time, the true original doctrine of Redemption. Such was the object of the *Levitical* dispensation.

‘The dispersion of the people at Babel had spread the corruptions of which they had been guilty, over the face of the earth; and it pleased God to separate from them a family who were to be the depositaries of that principle which was to give efficacy to all religious duty. For this purpose, Abraham was selected from amongst idolaters of Babylonia, to be the father of a nation to which

the new dispensation was to be committed. They were to preserve the true principles of religion for the rest of the world; and from them that Messiah was to proceed whom they never ceased to desire, though they so strangely misconceived his real character, and debased the sublime object of his mission.

‘The Patriarchal religion had been originally conferred on all mankind; its principle was universality: but that being now changed, and a single people being chosen out of the corrupt mass, in order to preserve the truth, we may say that the chief distinction between the two dispensations was, that the first was *universal*, the second *particular*.

‘The law, as delivered by Moses, and called the Levitical dispensation, because its ordinances were confided to the tribe of Levi, was not sent to do away the original religion, nor was it intended to supply new motives, or new sanctions. The law did not reveal the doctrines of the Divine Unity; or of redemption through a promised Deliverer; or of a state of future reward and punishment—for they had been already established; but to those great doctrines the law “was added, because of transgressions*.” It was *added*, in part, to preserve the knowledge of the Divine Unity in the midst of surrounding superstitions; in part, to preserve the doctrine of redemption amidst the idolatrous Gentiles; and also, by imposing on the Israelites numerous observances and restrictions, to preserve them separately from the world, a peculiar people; as Balaam said, “Lo, the people shall dwell alone, and shall not be reckoned among the nations.”

‘But as the time drew near when the Sun of righteousness was to rise, the characteristic of particularity began to be withdrawn from the Levitical church. The light of the gospel was preceded by a faint knowledge of the truth which began to spread into other parts of the world. The Babylonish captivity left some traces of it in the East; the emigration of numerous Jews into Egypt carried it there likewise; and the translation of the Hebrew Scriptures into Greek opened the eyes of many pagans, so that several proselytes to the worship of Jehovah were received into the Levitical church.

‘Such were the preparatory steps to the abolition of paganism, and to the introduction of the last, and most im-

* Galatians iii. 19.

portant, of the three dispensations; that which was to do away with all other codes and rituals—which was to put an end to all emblematic sacrifices—and which was to collect into one fold, under one shepherd, all the nations of the earth.'

29th.—This evening I was talking away at a great rate to Caroline—probably a great deal of nonsense—and having frequently used the expressions, 'I conceive, I imagine,' my uncle at last asked me if I could explain the distinction between those two words.

I considered for a little while, and then said, that though I had been using them very negligently, yet I thought I could point out the principal difference. *Conception* is the calling up an absent but distinct idea of something we have already perceived or felt—a complete picture in the mind of some former sensation. But by *imagination* we take a bit of one of these pictures and a bit of another—we select different circumstances from a variety of things that we have seen—and by combining them together according to some particular view, we form a new creation, and obtain the idea of something that we have not seen.

'Very well, my little Bertha,' said my uncle smiling, 'I like to see you exert your mind: but I would alter one part of your definition—I would not confine the imagination to objects of sight only; for though the mind dwells with greater facility on those that have been supplied by that sense, yet it is equally certain that our other perceptive faculties contribute their share also. The least imaginative person must recollect the many pleasing images which have been excited by the fragrance of distant fields, and the melody of unseen birds; and if you will accustom yourself to examine the process of your own imagination, you will find that an ample proportion of the subjects which pass through it are derived from all your senses.'

'But, uncle, do you think that I have such a metaphysical head as to be able to discover what is going on in my imagination? A thought comes, and though it is easy to perceive the immediate circumstance that suggested it, I am sure my giddy mind could not trace it further back than the first step.'

'Whatever be the character of your mind,' he replied, 'and whether you choose to observe them or not, those complex operations are habitually going on there; imaginati-

rapidly selects from the materials presented to it by memory, and by its own creative power forms new trains of thoughts to pursue. The fine arts furnish innumerable instances of this process. But imagination is not a simple effort of the mind :—tell me then, Bertha, if you can, what other intellectual faculties are engaged with it, besides conception, which you have rightly said only exhibits the simple objects of our former perceptions, and from which we are to make a fresh election ?

‘ I believe, uncle, there is first that power which enables us to separate from our conceptions those circumstances which are not wanted for our purpose—the name is——’

‘ *Abstraction.* It is one of the most important of our faculties, and is not less necessary to our general conduct in life, than for the most refined intellectual pursuits. It helps us to remove the glare which often dazzles and deceives our moral perceptions ; it reduces our complicated ideas to their constituent parts ; and it presents us with the means of considering certain qualities of an object apart from the rest ; and, therefore, of classing them with others ; in short, it is equally subservient to the power of reasoning and to that of imagination. But go on, my dear—what next ?’

There was something so encouraging in my uncle’s manner of questioning me, that instead of frightening, it helped me to think. ‘ Perhaps it is that which guides us in putting together the materials which we have been selecting ;—or rather of arranging and suiting them to each other ;—taste, I think.’

‘ Right, Bertha : *taste* adapts and redispeses them in the best manner ; and the more or less successfully as the *judgment* is more or less consulted. Without taste and judgment, the imagination would jumble them altogether at random, and would produce nothing but confusion and deformity. Paintings and poems may contain many beauties, and yet may totally fail in giving satisfaction ; simply from the parts being ill-assorted—or, in other words, from a deficiency of judgment in their combination.’

‘ But is there not another quality which is essential in a poet ?—I mean, uncle, the power of catching the resemblance of ideas ;—that which produces those beautiful allusions that form the ornament of poetry.’

‘ You mean *fancy*—the power of quickly perceiving those delicate links which connect the most remote objects ; and

which, however slight, are sufficient for poetical analogies. The more sober analogies, which suit the province of science, may be elicited by laborious reflection, or plodding perseverance; but fancy flashes them across the mind of the true poet, and, by a sort of inspiration, furnishes him with an exuberance of materials. But here again, Bertha, he must have recourse to taste and judgment, if he would make an agreeable impression on the minds of others. The ornaments of poetry, you say, are the allusions; but in order to please, the points of similitude must, on the one hand, be so obvious as to excite the immediate sympathy of the reader; and yet, on the other, they must be so disconnected as to display ingenuity by their comparison or contrast, and to surprise with their novelty.

— Hope and fear, alternate, sway'd his breast,
Like light and shade upon a waving field
Coursing each other, when the flying clouds
Now hide, and now reveal the sun.

I think the conditions I laid down are both completely satisfied in these beautiful lines from one of Home's tragedies. But if poetical allusions were merely employed for ornament, they would cloy the taste and encumber the sense—they must therefore help to illustrate and give force to those ideas that would otherwise be obscure, or which would be too rapidly passed over by the reader. For this reason they are generally taken from material objects with which our senses are most conversant, and are applied by the fancy to those parts of intellectual or moral subjects which require illustration, and on which the mind is invited to pause.'

Caroline concluded the conversation by repeating Warton's lines on Fancy.

Waving in thy snowy hand
An all-commanding magic wand,
Of power to bid fresh gardens grow
'Mid cheerless Lapland's barren snow;
Whose rapid wings thy flight convey
Through air, and over earth and sea,
While the various landscape lies
Conspicuous to thy piercing eyes.

30th.—It is curious, that it has never been ascertained what becomes of swallows when they disappear in autumn. Some naturalists have supposed that they retire to hollow

trees, old buildings, or caves, where they remain in a torpid state during the winter; while others affirm that they lie at the bottom of lakes and ponds. This last, my uncle says, is a most extravagant idea, for nothing can be more certain than that they would decay there in a short time; besides, it is well known that they moult or change their feathers early in the year, and no one can imagine that this can be accomplished while they are torpid and under water.

Facts, however, have not been wanting, to support both these opinions; numbers certainly have been found in old dry walls and cliffs, and several were taken out of the shaft of an abandoned lead mine in Flintshire, clinging to the timbers, and apparently asleep. They were startled by a little sand being thrown on them, but they did not attempt to fly or change their place; this happened about Christmas.

For the watery system, Kalm, the traveller, is a decided advocate: my uncle showed me a part of his 'Travels in America,' in which there is a good deal on this subject; but I must say it does not clear up my doubts. From Spain, Italy, and France, Kalm admits that they remove to warmer climates; but in England and Germany, he says they retire into clefts and holes of rocks, and in cold countries immerse themselves in the sea, or in lakes. He gives several instances of their having been found in this state in Prussia; but, even by his own account, it does not appear that they could have been to any depth in the water—for all those which he mentions were caught with a net among the reeds and rushes growing on the borders.

'Besides,' said my uncle, 'as they are lighter than water, they could not sink, even if they tried to do so; and as the lungs of birds differ very little in their structure from those of quadrupeds, it is quite incredible that they could live for several months, or for several minutes, under water: Even diving birds come up exhausted, and would be drowned like any other animal, if retained under water beyond a certain time. Swallows and martens, indeed, sprinkle and splash themselves as they glide along the surface, but they never dip completely into the water for a single moment. At the season when they disappear there is no want of their insect food in the air; nor have any of those cold blasts come, which, at a later period, would benumb them; what, then, could induce them, particularly the young birds who have

just begun to enjoy the use of their wings, to take a dreary plunge into a pond? Cold and scarcity may drive some animals to hibernate, like your little dormouse, Bertha; but I am satisfied that the whole tribe of swallows fly off, like other birds of passage, to distant countries.'

'To what countries?' I asked him.

'It is probable,' he replied, 'that there is some genial temperature that suits them best, or that is most productive of those insects on which they prey; and as the seasons change, that temperature can only be obtained by approaching the equator, or, perhaps, by passing into a corresponding latitude of the Southern hemisphere. A circumstance mentioned by our friend Colonel Travers, made a strong impression on me:—when he was going up the Mediterranean, I think in the latter end of April, a great number of swallows settled on the yards and rigging of the ship: they began to alight there about sunset, and before nine o'clock some thousands had collected; but in such an exhausted state that they immediately went to sleep, and allowed themselves to be handled without making any attempt to escape. At daylight next morning they rose, as if by a single impulse, and flew away to the northward; and several prodigious flights of the same bird were observed, at a great height in the air, pursuing the same course towards Europe.'

'Poor creatures,' said Frederick, 'they must have come all the way from the north coast of Africa. Can you tell me, father, in what part of the Mediterranean this happened, that I may measure on the map the distance they had flown?'

'I do not recollect,' said my uncle; 'but if I am right in my ideas of their swiftness, the widest part of that sea would be the affair of a few hours. It has been estimated that a swallow usually flies a mile in a minute; and sixteen or seventeen hours' daylight will give about a thousand miles for a single day's journey at that velocity. Now when you recollect that here we see these birds continue on the wire the whole day without the least appearance of being tired, you can only account for the extraordinary fatigue of those which perched on the Colonel's ship, by supposing their flight to have continued for several days; and thus three or four days' exertion might have brought them from a country bordering on the southern tropic.'

I reminded my uncle of the account we had lately read in Dr. Brewster's *Journal of Science*, about the rapid flight of the wild pigeons that cross America in search of food.

'Yes,' said he, 'and there is a curious fact recorded in that paper, which satisfactorily demonstrates, that the sustained velocity with which some birds remove from one district to another, in search of food, is not confined to the instinctive energy which belongs to the time of annual migration, but that it is their habitual and daily practice. The circumstance to which I allude is this:—pigeons have been killed in New York, whose craws were still filled with fresh rice, which must have been collected in Carolina; and, therefore, as the pigeon digests its food very quickly, they could have been but a few hours performing a journey of three hundred miles. But we need not go so far off for examples of the ease and rapidity with which pigeons go to great distances in quest of some favourite food; for it is well known, that in the vetch season in Norfolk, the Dutch pigeons come over in the morning, and return to Holland in the evening.'

Mary showed us a passage in the voyage of La Pérouse, which proves that swallows do go a long way to the southward. 'A swallow of the common species, undoubtedly lately come from Europe, followed us for some time without alighting on the vessel, but soon directed its flight towards the African coast, where it was sure of finding the insects on which it feeds. We were in 28° N. lat., and 22° W. long.' Adamson also asserts that he witnessed the arrival, on the coast of Senegal, on the 6th of October, in the evening, of real European swallows; and he ascertained that they are never seen there but in autumn and winter.

My aunt has often observed them collected in large companies on trees, and on the roofs of houses, previous to their flight in September; and the direction they take at that season is to the southward.

My uncle then told us, that his old and highly respected friend, Dr. Jenner, who, you know, lived just on the other side of the Severn, used to remark, that if swallows really did creep into holes and crevices to hibernate, they would surely appear in a languid state when they came out again—in the same way that all those quadrupeds who pass the winter in a state of torpor, are very much emaciated when they revive. The hedgehog, for instance, at the approach

of winter, retires to its nest covered with fat, which is entirely absorbed when it awakens on the return of spring; whereas, when the swallows appear in April, they are plump and strong upon the wing.

Mary added, that swallows have two broods during the summer, and that she had somewhere read, that it was only the strong early brood that took flight to warmer regions; but that the young birds hatched late in the year, being incapable of distant migration, seek shelter in holes and hollow trees, and wherever they can lurk in safety in the winter.

Mary afterwards showed me a passage about swallows in Latrobe's Journal, a book which I have more than once mentioned to you. He writes from the settlement of Groenkloof, to the north of Cape Town.

'Every morning I am greeted by the pleasant chirping of two swallows, which have a nest in the corner of my room, under the ceiling. There is hardly a room, kitchen, or outhouse, in the country, without these inmates, and it would be thought next to murder to kill them. They build their nests of clay in the shape of a bottle; they line them with the softest down, and though they leave the country during the winter, the same birds always return to the same nests after their emigration. As the room doors usually stand open in the day, they go in and out whenever they please; but if the door is shut, they give notice of their wish to go abroad, by a gentle piping and flying about the room; and no one thinks it troublesome to let them out; indeed, I have often left my bed to open the door for them.'

I forgot to mention that my uncle told us there was no country in the world which was not visited by these little swift-winged creatures. They were seen, for a short time, even in the frozen regions of Baffin's Bay and Melville Island; and Captain Franklin says, they made their first appearance at Great Bear Lake in the middle of May, to feast on the mosquitoes and other insects that abound on the northern shores of America. Wentworth says, they may be literally called cosmopolites.

31st.—After dinner yesterday, the conversation turned on the importance of the palm tribe in their native countries to the inhabitants. Sago, cocoa-nuts, dates, oil, and various other articles of excellent food which they produce, were all discussed; and each of us mentioned some of the many uses to which the stems, the leaves, and the fibrous parts were

applied. Miss Perceval afterwards endeavoured to explain the botanic distinctions between palms and tree-ferns, which have so many points of resemblance in their mode of growth : but my aunt suggested, that her description would be much more interesting if we were looking at the plants ; and she kindly proposed another expedition to those magnificent stoves of Lord S., that we had seen with so much pleasure last autumn.

Miss P. approved of this arrangement, and she has been exceedingly gratified to-day with all she saw ; but none seemed to be more delighted with our visit than the old gardener. He perceived how well she could appreciate his difficulties and his success ; and he listened with the greatest attention to all her remarks. Miss P., however, did not forget the circumstance that led to our visit, and she showed us in several different palms, that the scales of the foot-stalks completely sheath the stem ; and that after the decay of the leaf they form an entire ring, which has a very different appearance from the separate marks or cicatrices left by the fronds of the fern.

She had never seen so fine a collection of palms in this country ; and she told us many circumstances of their history and habits. She made us observe, that in the leaves the fibres run parallel to the edges. There are two grand forms to which the leaves may all be referred ; pinnated, as in the cocoa and date ; and fan-shaped, as in the dwarf and fan-palms. In the dwarf which we examined, the breadth of the leaf is considerable, but from the direction of the fibres, and the manner in which it is folded, previous to development, it may rather be regarded as composed of several leaves.

The flowers of palms are even more numerous than I thought, though I remember, at Rio, trying in vain to count those of the *alfonsia amygdalina*—it would have been a hopeless work, for Miss P. says one spathe sometimes contains sixty thousand.

Some palms are gregarious, forming large woods, and naturally spreading over whole districts ; as the dwarf palm does in the south of Europe. She says, that the different species are never much intermixed ; though their districts are small, they are generally distinct from each other. It is remarkable that no palm of the old world is found in America, except the cocoa-nut and the oil-palm of the coast of Guinea ;

and that there is but one species common to Asia and Africa. The palms of New Holland, also, are peculiar to that country; and I believe that she said, those of the Mauritius only occur in those islands. The cocoa, the date, and the sago palms, are the most widely distributed; but the true home of the palms is the torrid zone; for, of one hundred and ten well-known species, only twelve are found outside the tropics.

I asked Miss P. whether the leaves which are found lining the tea-chests belong to a palm. Certainly not, she said, nor to any of the cane families, as is evident from the want of a midrib; it is generally believed that they belong to some of the grass tribes, and indeed very closely resemble the broad-leaved *pharus*.

My uncle pointed out to her several large and flourishing plants of the *ficus elastica*, or caoutchouc tree. They have succeeded so well for the last two years in a stove kept at a very low temperature, that some of them are now removed to the green-house, and even one or two are put out of doors. As we drove home, I asked my uncle at what time caoutchouc, or Indian rubber, was brought to this country.

'It appears,' said he, 'to have been first introduced into Europe about the middle of the last century; and is, I am sure you know, procured from two other South American plants, as well as from the *ficus*; I mean the *havea*, now called *siphornia*, and the *jatropha*. The juice, which is obtained by an incision in the bark, is made to spread itself in successive layers, over clay moulded into the form of a bottle, and when sufficiently thick, it is hung over the smoke of burning wood, which hardens, and gives it a dark colour: the clay is afterwards crumbled and thrown out. It is fabricated, by the inhabitants of its native country, into vessels to contain water and other liquids; and it is in some places used by the fishermen for torches.

'Caoutchouc is also procured from a climbing plant, *urceola*, a native of Sumatra. If one of its thick old stems be cut, a white juice, like cream, oozes out; by exposure to the air, a decomposition takes place, and while part of it concretes, a thin whitish juice is separated. Cloth, well covered with this juice, becomes impervious to water; and the pieces so prepared are easily joined together by applying fresh juice to the edges.'

I asked my uncle, on our road home, if it was by means

of that juice that the waterproof cloth, which he had seen in London, was prepared.

He answered, that he had seen some of the juice at the Royal Institution, where it had been brought from Mexico to be analyzed; but that, in general, caoutchouc was imported in a solid state. 'A cheap method,' he continued, 'of dissolving it was discovered by Mr. Mackintosh; and his mode of applying it to cloth, linen, silk, or any materials of that kind, was equally ingenious and useful. When reduced to a fluid state, a sufficient coat of it is laid upon the cloth, and another piece being then spread over it and pressed together, they become permanently united as well as waterproof; but as the outside and the inside need not be similar, you may have the one of cloth and the other of velvet; or a camlet cloak lined with silk, or any other combination you please.

'There are many other purposes to which this contrivance has been applied. *Hoses* for conveying the water from fire-engines, when made of canvass and caoutchouc, and without seam, are much stronger, more durable, and more flexible than those made of leather. I have been told by a naval officer, that a hose of this sort affords an excellent mode of filling the casks in a boat, from a well or stream near the shore, when a heavy surf prevents their being landed; for it is obvious that such a hose may pass through the sea, without the possibility of the fresh water it conducts being tainted by the salt. It is also well adapted to tilts for waggons and hay-ricks; it would make admirable military tents; and you may imagine what a comfort waterproof bags must have been in Captain Franklin's expedition to the Polar Sea, in keeping the men's clothes dry, notwithstanding the dismal weather to which they were so often exposed.

'There is only one more use which I will now mention. Any substance that is carefully coated with this gum is as impervious to air as to water: bags, therefore, made in the shape of cushions or pillows, which can be folded up and carried in the pocket, may be in a few moments inflated with the breath by means of a small pipe; and even beds, which, when empty, would occupy but little room in a port-manteau, would often preserve the health, and greatly add to the comfort of travellers in certain countries, where a dry, clean, and soft bed is an unattainable luxury.'

Miss Perceval told us that in some of the forests of Guiana, a substance called *dapicho* by the Indians, is found in large masses underground; and which, having all the properties of the recent gum, was long known by the name of fossil caoutchouc. But the indefatigable Humboldt, having at last succeeded in finding some of it undisturbed in the ground, at once perceived that it had oozed out of the roots of caoutchouc trees which were so old that the interior had begun to decay. It is white and brittle till exposed to a strong heat; and when sufficiently beaten with a heavy club, it acquires great elasticity. The Indians make their famous tennis balls of it; it is also cut into corks, which are very superior to those made of the cork tree; and it is worked up into enormous drum-sticks—the drum being merely a hollow cylinder of wood about two feet long.

‘There is, however,’ my uncle observed, ‘a species of fossil caoutchouc. It is, in fact, a bitumen, but flexible and elastic; and, as it has the property of cleaning off pencil-marks in the same manner as Indian rubber, it has been named mineral caoutchouc.’

I asked him if it might not be some of the *dapicho*, which had lain buried in the ground, long since the trees, from which it oozed, had perished?

‘I have but two reasons, Bertha, to oppose to your theory. It is only found near Castletown in Derbyshire, and you know the English climate is not very well suited to those trees—and, secondly, it is in the deep recesses of a lead mine, surrounded by spar and limestone.’

June 1st.—You may remember, Mamma, how much I was interested, last year, by my uncle’s illustrations of the Mirage and the Fata Morgana. The subject was often afterwards alluded to in conversation; and my aunt having incidentally mentioned it to her charming correspondent in Upper Canada, I was this afternoon agreeably surprised by her reading aloud the following passage in a letter which she had just opened:—

‘Your young friend Bertha will be pleased to hear that last June I witnessed something very like that curious phenomenon which you say interested her so much. One morning I awoke just at the break of day, and accidentally directing my eyes to the window, which has a southern aspect, I was astonished to see—instead of the black monotonous forest by which we are surrounded—a wide, mag-

nificent sheet of water, connected with a spacious river, winding to a great distance, and confined by gentle slopes and grassy banks; and all this so distinct, that the bright fresh green of the young leaves was beautifully contrasted with the dark foliage of the pine woods.

‘I rubbed my eyes, and looked again—for it appeared to be exactly our lake near Peterborough, with the Otanabee River winding towards Rice Lake, except that the whole view was reversed. I wondered how all this could be seen over our lofty trees, and I went to the window and leaned out to look for objects which I knew—but nothing was to be seen except my beautiful and inexplicable landscape. I lay down, and still saw it from my pillow;—but my eyes gradually closed; and, when I again awakened, heavy mists had risen with the sun—and my fairy prospect had vanished.

‘I now recollected the description I had long ago read of the Fata Morgana, and I was satisfied that this was no vision of my fancy, but the reflection of real scenery upon some peculiar vapour which only appears at that early hour of the morning.’

2nd.—I spent a great part of this morning in examining the ingenious leaf-nests of some little caterpillars, which Mary says are the larvæ of the *tinea* moths. She explained to me their construction. The caterpillar fixes a number of fine silken cords from one edge to the other of the leaf, and by pulling at them with its many strong feet, the sides are gradually forced to approach each other till they meet, when it fastens them together with short threads. Sometimes the large nerves of the leaf are too strong to yield to these efforts, and the clever little creature immediately weakens them by gnawing them half through in different places. I could distinctly perceive those places in several of the leaves which we opened. Some species cut out a long triangular portion from the edge of the leaf, and form it into a conical roll, like a paper of comfits; in one spot, however, they let it remain attached to the leaf, by way of a base, and then, by fastening little cords to the points of the cone, it is actually pulled upright on the remainder of the leaf, where it stands like a tent. But there are other *tineæ* which show still more dexterity in constructing their habitations. Some of them we found on the under sides of the leaves of the rose-tree, apple, elm, and oak; and Mary made me observe how nicely they form an oblong cavity in

the interior of the leaf, by eating the pulpy substance between the two membranes composing its upper and under sides. The detached pieces are then joined with silk, so as to make a case or horn, which is cylindrical in the middle, with an orifice at each end, the one being circular and the other triangular; and the seam is so artfully made, as to be scarcely perceptible even with a glass. Were this case all circular, it would be more simple; but the different shape of the two ends renders it necessary that each side should be cut into a different curve.

But I should fill my whole journal, were I to tell you all the beautiful contrivances of these insects, and the instinct, or, I might say, the reason which appears in all their contrivances.

3rd.—My uncle mentioned yesterday, that in returning a few years ago from Berwick-upon-Tweed, he was much surprised, as night came on, at seeing two immense fires near Newcastle. Upon inquiring, he found that they were the small coal which does not readily sell, and is therefore separated by screens from the larger blocks. Prodigious heaps are thus formed at the mouths of the pits; and from the decomposition of the pyrites, they take fire, and continue to burn for years. One of these huge mounds was but a few miles from the road; it was said to cover twelve acres of ground, and to have been burning for eight years.

As all that small coal might be made use of to produce coal gas, he says the legislature should interfere to prevent such a shameful waste, for not less than one hundred thousand chaldrons are thus annually destroyed on the banks of the River Tyne; and nearly the same quantity on the Wear. Beneath these burning heaps, he found a bed of blackish scoria, which resembles basalt, and which is used for mending the roads.

To the west of Dudley, in the great Staffordshire coal district, my uncle says that some of the collieries took fire spontaneously many years ago. The subterraneous conflagration spread to a great extent, and produced some singular effects; smoke and steam were seen to rise from the earth, the vegetation appeared to be hastened by the heat, and even the ponds were warm. What was still more remarkable, where the ignited part of the coal came near the surface, the argillaceous strata (or potter's clay), covering it, have been converted, by the intense heat, into a species of

porcelain jasper, which is sometimes beautifully striped; this last circumstance being caused by the various degrees of oxidation of the iron that is contained in the clay.

WEEK 44.

The Christian Dispensation—Declarations of Scripture—Herculaneum Manuscripts—Sir H. Davy—Palimpsests—Alpes Penninæ—Elfbolts—Hyacinths—Mowing—Sheep-shearing—England's Fleeces.

June 4th.—Sunday. This morning—perhaps the last Sunday that we shall spend at Fernhurst for many months—my uncle finished explaining to us the three dispensations; and it made the more impression on me, as I fear that, on our journey, we shall not have any of those regular Sunday conversations, which have been so instructing and satisfactory.

‘The object of the Christian Dispensation,’ said he, ‘was to ratify the promises of redemption and of eternal life, through the merits of a divine mediator. What the former dispensations announced as *to come*, this concluding dispensation has exhibited in actual accomplishment. The long-expected Redeemer has been manifested; he has made the promised atonement for the sins of mankind; he has shown himself as the mediator of the new covenant, and the doubts of ages have vanished before the light of the Gospel.’

I ventured to interrupt my uncle, to ask why it is called the *new* covenant, as if it was of a different nature from the two former ones.

‘It is so styled,’ he answered, ‘not as being new in its nature, or different from those which preceded it; but merely as being new, or last in order, and therefore superseding all others. The typical sacrifices of the two former were, you know, the symbols of the real victim who consummated the Christian covenant. In each of them provision was made for the reconciliation of fallen man; and the object of each being the same, the terms were the same: Jehovah graciously promising on his part to accept the meritorious death of the Messiah, as a full acquittal and satisfaction of all sin; but, on the two-fold condition, of faith and of obedience on our part.’

‘The doctrine of atonement through the sufferings of the Mediator forms the basis of each of the covenants, and is

justly considered, by all those who take their religion from Scripture, as the corner-stone of the Christian dispensation. The proofs of this essential tenet are as numerous as they are clear and explicit; and, in the last discourse which our Saviour held with his disciples, and which is fully recorded by St. John, you will find it very distinctly stated.

'A being of that transcendent dignity who could say, "All power is given to me in heaven and in earth," would scarcely have been sent for the mere purpose of communicating a clearer knowledge to mankind of their duty, or of setting before them an example of practical holiness. These, no doubt, were among the objects for which the Son of God became man; but they were only collateral objects. In order to appreciate the importance of his mission, we must compare it with the modes adopted on former occasions. When the corruption of mankind drew down the dreadful chastisement of the deluge; and when, after that catastrophe, the patriarchal covenant was renewed, and fresh blessings and privileges were offered to the posterity of the second father of mankind, the only communication of these signal events was announced through Noah. When God vouchsafed the second covenant, and established the Jewish religion by direct revelation, a mere human agent, Moses, was employed. And when the idolatries and wickedness of the Israelites induced the merciful Governor of the universe to interfere, Elijah, and other mere prophets, were sent to reclaim them.

'If therefore, when Christianity was revealed, the only intention had been to prescribe a purer mode of worship, and to withdraw mankind from their vicious career, why should not that mission have been intrusted to another prophet, instead of requiring the special interference of the Son of God?—Still more, if no other purpose was to have been accomplished by the coming of Christ, why was it ordained that he should suffer death, in attestation of his doctrines? Noah died a natural death; so did Moses, full of years and honour; and Elijah was distinguished by the privilege of not dying at all. From this comparison alone we might safely infer, that the sufferings of our Saviour were connected with some other momentous object—and in all parts of the Scriptures we find that object declared in the most express terms. I will point out to you a few passages which cannot be mistaken or perverted.

“ He was wounded for our transgressions; and the Lord hath laid on him the iniquity of us all.”—“ He was made an offering for sin.”—“ He taketh away the sins of the world.”—“ If any man sin, we have an advocate with the Father, Jesus Christ.”—“ Christ, our passover, is sacrificed for us.”—“ We have redemption through his blood.”—“ The Son of man came to give his life a ransom for many, a ransom for all.”

‘ These passages solve that great enigma, and explain, in the most distinct language, the sublime and merciful object of the Christian dispensation. And now let me ask you all, what are the impressions with which this view of it should fill our hearts? Should we not be overwhelmed with the magnitude of the mercy; and eager to exclaim with the Psalmist, “ Lord, what is man, that thou so regardest him ! ”

‘ But in thus summing up the proof of this mysterious plan of redemption, it is highly necessary to remind you, that it is *conditional*; that salvation is offered to you, not forced upon you; and that it is offered solely on the terms of implicit submission to the commands of our Redeemer. If you reject the Gospel; or if, persuading yourselves that you believe in its truth, you allow your actions to be in contradiction to its precepts; or if, in cowardly subservience to the fashions of the world, you seem ashamed of your Mediator and Substitute, then you can claim no share in his ransom. My dear children, the alternative is fairly set before you, and you must make your own choice.’

Mary asked her father whether this third dispensation did not materially differ from the Levitical, in its again embracing *all* mankind in its offered benefits.

‘ Yes,’ said he, ‘ like the Patriarchal dispensation, it is universal in its object. Christianity is, in fact, but the completion of Patriarchism; the law having been a connecting chain between them. Under the Patriarchal dispensation all men were taught to look forward to the promised Deliverer; under Christianity all men are taught to rejoice in the actual appearance of that promised Deliverer, who has done and suffered everything that was predicted of him.

‘ Christianity has not yet become universal; but the purpose of the Almighty is still powerfully though silently working. In the appointed time, “ the earth shall be full

of the knowledge of the Lord," and the Messiah will be universally acknowledged by Gentiles, Jews, and all nations. "Thus from first to last, under the Three Successive Dispensations," has God carried on one consistent and harmonious scheme of grace and mercy for the salvation of his fallen creatures.'

5th.—This evening, in talking of the variety of representations that different historians give of the same facts, my uncle was lamenting the loss of the many ancient works which are alluded to in contemporary authors, but which appear to have perished; and he particularly regretted the 105 books of Livy's Roman History, which originally consisted of 142.—'But,' he added, 'there are some hopes that they may yet be recovered.'

Mary asked him if there was any chance of their being found among the Herculaeum manuscripts?

'Very little indeed,' he replied. 'When those famous rolls of papyrus were disinterred nearly eighty years ago, great expectations were formed of the literary riches they might contain. Their original number was 1700, but by far the greater part were found, on closer inspection, to be so mangled, that there was not the least probability of recovering any portion of their contents. Of those that were in a better condition, many were destroyed by the first awkward attempts to unroll them; and, unfortunately, the remainder have suffered great additional injury from long exposure to the air.'

'I should have thought,' said Wentworth, 'that having been partly charred by fire, they would be proof against air and damp; as we find old stumps of charred gate-posts in the ground, which seem to have remained there an immense time, perfectly unchanged.'

'Your reasoning,' replied my uncle, 'would not apply to this case, even if the papyri had undergone the action of fire, because it is since their exposure to the atmosphere that they have suffered. They have, indeed, all the appearance of charcoal, even the sticks on which they are rolled; and it was therefore very naturally supposed that this effect had been produced by the heat of the lava which overflowed that devoted city; but Sir Humphry Davy has proved, that they were protected from the heat by a thick bed of sand and ashes, and, in his opinion, their charred appearance has been the result of a gradual process of decomposition.'

‘What means, uncle, could be taken to unfold and read manuscripts that were in such a state? Surely all the characters must have been effaced!’

‘No, not quite: the characters are seen black and shining upon the black but not shining surface; just in the same way that a letter sometimes appears after we have burnt it, the traces of writing being still visible on the gauzy substance, while it flickers about in the smoke at the back of the grate. To unroll them, many ingenious contrivances were invented; that which I saw, when at Portici, and which, I believe, has been generally adopted, is to glue some thin flexible material to the back of the papyrus, and then to raise it gently by a number of threads, while the folds are at the same time carefully opened by a pin. In this way a few of the most perfect have actually been restored and published; but, to the great disappointment of the world, they are works of no value. One is a treatise on the inutility of music, in Greek; a few pages of a Latin poem, and some other fragments, but all equally uninteresting. One of the chief difficulties arose from the adhesion of the folds, as if they had been gummed together; and, to conquer this, Sir Humphry applied the resources of his profound chemical knowledge. He exposed some of the fragments to the action of chlorine, and to the vapour of iodine, and succeeded, to a considerable extent, in loosening and detaching the folds; but the jealousy of the Neapolitans prevented his further progress, and he left them to pursue their own plans. Unfortunately, the best specimens were operated on long ago; and those that now remain are in too mutilated a state to afford much hope for the future.’

‘But,’ said Caroline, ‘as they are rapidly unburying Pompeii, perhaps some manuscripts may be found there, and in a much more perfect state; for Pompeii was covered with mud and ashes, and not with burning lava, like Herculaneum.’

‘Several rolls of papyrus,’ my uncle replied, ‘have been already found in the houses of Pompeii, but all in a far worse condition than those of Herculaneum—having nearly the appearance of the white ashes produced by burning common paper.’

‘Then, uncle,’ said I, ‘to what quarter do you look for the lost books of Livy?’

‘To the vast collections of vellum manuscripts,’ he an-

swered, 'which have for centuries been accumulating in public and private libraries. It has been discovered, that many of these have been twice written upon, and some even three times. In the middle ages the art of reading and writing was almost entirely confined to the monks; and all true taste for literature being suspended, it was natural that they should consider the finest effusions of the ancient poets, or the most important records of profane history, as of little value, in comparison with the statutes of their own order, or the histories of their general councils. It appears, therefore, to have been a common practice of those times, to expunge the writing on the parchment manuscripts in their possession, in order to substitute copies of those works which they estimated so much more highly; and in some instances the former characters have been discovered, and successfully traced.'

'But, papa, if the original writing was expunged, how is it now legible?' Frederick asked.

'The ink,' said my uncle, 'in general use among the ancients, was merely a mixture of lamp-black and gum; and as that did not sink into the parchment, a wet cloth in the hands of a monk did the business as effectually and finally as your sponge, Frederick, annihilates your most elaborate calculations from a slate. But the injury to which writing with such materials was liable, from damp and other accidents, had been long known, and various expedients were adopted to provide a remedy. Pliny says it was difficult to efface ink which had been made with vinegar; and it appears, that at a later period some preparation of iron was added for the same purpose, as both of these ingredients sink into the parchment. In either of those cases, the lamp-black, or colouring matter, could be only partially removed by washing; so that it was necessary to scrape the surface, in order to obliterate the characters, or to rub it with pumice-stone, in the same manner that it had been originally prepared for writing on; and to such a parchment or manuscript the name of *palimpsest* was given, from a Greek word signifying twice scraped. But though the process that I have described apparently removed the writing, it could not draw out the infusion of iron which had been absorbed by the parchment; and as you all know that ink is nothing but a combination of iron with a solution of *galls*, it will readily occur to you, that by applyin

that solution with a light brush to any of the palimpsest manuscripts, the original writing would be revived,—provided there had been any iron in the composition of the ink.

‘What a beautiful discovery!’ exclaimed Caroline. ‘And when generally known, how zealously will all our antiquaries attack the hordes of manuscripts now dormant in the public libraries!’

‘Yet,’ said my uncle, ‘it is not a new discovery: the celebrated Montfaucon endeavoured to draw the attention of the learned world to these palimpsest parchments just a century ago; but antiquaries are not put into zealous activity quite so easily as you imagine. In that long interval, nothing very material seems to have been effected, till the present accomplished librarian of the Vatican devoted himself to the subject; and the success with which his efforts have been already crowned more than justifies the sanguine hopes which I expressed. Other industrious labourers are also in the field, and what has been already achieved is only a pledge of the rich harvest that will distinguish this age.’

6th.—In conversing about our approaching journey, and the fine mountainous tracts that we are to see in Wales, Wentworth asked the meaning of the word *pen*, which is prefixed to some of the Welsh names, as *Pen-man-mawr*, for instance.

‘It is an old British word,’ my uncle told him, ‘signifying head or summit; and it is joined to the names of several of those hills, amongst the inhabitants of which much of that ancient dialect is still to be found.’

‘It is singular that this term appears to have been used in the same way among the Romans; for we find that the crest of the Alps near Mount St. Bernard was anciently called *Alpes Penninæ*; and that the very same name was also applied by them to the central chain of mountains which extends from the borders of Scotland to the middle of Derbyshire. This Penine chain traverses the great northern coal district; and many of its hills retain the old British term *pen*, as *Penygent*, *Pendle Hill*, &c.’

‘There are several wild and very picturesque views,’ said my aunt, ‘in that Penine chain; and its caverns, precipices, and torrents, have all a singular character, particularly the sublime and curious scenery of *The Peak*. I am sure, Caroline, you recollect a beautiful description of the banks of the Greta, in Yorkshire, in your favourite poem of *Rokeby*.’

Caroline immediately repeated these lines :—

Broad shadows o'er the passage fell,
 Deeper and narrower grew the dell;
 It seem'd some mountain, rent and riven,
 A channel for the stream had given,
 So high the cliffs of limestone grey
 Hung beetling o'er the torrent's way,
 Yielding along their rugged base
 A flinty footpath's niggard space;
 Where he who winds 'twixt rock and wave,
 May hear the headlong torrent rave,
 And like a steed in frantic fit,
 That flings the froth from curb and bit,
 May view her chafe her waves to spray
 O'er every rock that bars her way.

'I have lately read two facts,' Mary said, which show the depth of those remarkably abrupt ravines that intersect the craggy mountains in the moorlands of Staffordshire. In Narrowdale the sun is never seen by the inhabitants for the three winter months; and even when it is visible, it does not rise to them till one o'clock in the afternoon. The other circumstance is this—at Leek, the sun, at a certain time of the year, seems to set twice in the same evening; for, after it sinks beneath the top of a high intervening mountain, it again breaks out from behind the steep northern side before it reaches the horizon.'

7th.—My uncle showed me to-day a hard black substance, of very close grain. I did not know what it could be, for it evidently was not coal nor flint. He told me, that the soil which covers the great northern coal-field appears to be alluvial, and that it contains masses of all the different rocks that compose the whole district; and among them, portions of this hard black *basalt* are found everywhere in abundance.

'I show you this,' he said, 'because the ancient inhabitants of Britain formed the heads of their battle-axes, which are commonly called *celts*, from this stone. They resemble in shape the tomahawks of the South Sea islanders. Barbed arrow-heads, neatly finished, and made of pale-coloured flint, are also frequently picked up on the moors, and are called *elf-bolts*.'

I asked if those things were often found in other parts of England, as they must be very interesting in tracing the history of our early ancestors.

‘Yes,’ said he, ‘in all parts of Great Britain; and not only weapons, but various utensils; besides other articles, of which the uses have not been ascertained. For instance, at Kimmeridge, on the coast of Dorsetshire, where there are beds of a kind of stony coal, there has been found on the tops of the cliffs what the country people call “*coal-money*.” The pieces are round, and about two inches and a half in diameter, by a quarter of an inch in thickness; one side is convex, with mouldings, and the other is flat and plain, but with two, or sometimes with four small round holes in the surface. They are, in general, two or three feet below the surface, inclosed between two stones, set edgewise, and covered by a third; and the bones of some animal are always found along with them. A little deposit of this coal-money was also discovered in a shallow bowl of the same material.’

‘And was coal ever really used as money, uncle? It would make rather a bulky currency.’

‘Some people imagine that they were amulets; others, that they were connected with the ancient Druidical rites; and many suppose them to have been coin. Perhaps the cant or vulgar expression, “Down with your coal,” which means “Pay your money,” may assist you in choosing which of these hypotheses you like best.’

8th.—The back gate of the garden is not often unlocked, and to-day, when the gardener was going to open it, the key-hole appeared to be so stopped up, that he took off the lock, and finding a little nest in the inside, he brought it to my uncle.

It proved to be the nest of a species of bee called *apis manicata*. The cells are formed of two or three layers of a silky membrane, which seems to be composed of a kind of glue secreted by the insect; it resembles gold-beater’s leaf, but so thin and transparent, that you can distinguish through it the colour of the smallest object. As soon as each cell is completed, I am told that the bee deposits an egg in it, and then nearly fills it with a mixture of pollen and honey; and so proceeds till all the cells are finished and filled. As the situation is rather cold for the grubs, we found the cells plastered over with the same composition, and even a warm outer coating of wool was stuck to this paste to preserve them from any change of temperature. The wool appeared to be the down of some plant; and my

uncle says, they have been observed to scrape the down from the leaves of the woolly hedge-nettle, and the common rose campion, with their mandibles; while with their fore legs they roll it into a little ball and carry it to the nest.

I have been excessively busy putting my garden in order before we set out. Indeed, I have become so wonderfully active, that you would scarcely know your little indolent girl; and I am often inclined to sing the old nursery song to myself, 'Sure this is none of I?' Among other things, I have performed a grand operation in my hyacinth beds. Lady Binning, you know, is a great florist; I heard her speak of the manner in which her gardener manages the hyacinths, for which her garden is remarkable; and I determined to try it. As soon as the leaves become all yellow, he takes up the bulbs, removes the loose skins and offsets, and all the fibres that are decayed, and immediately replants them in a bed of fresh compost. Lady Binning told us that, when treated in this manner, they equal the Dutch hyacinths in strength.

All this was duly executed yesterday. I had been watching the leaves for some time, as I wanted them to be quite yellow; and I now flatter myself with having a very grand display next year.

I had also many cuttings to make, and seedlings to plant out, as well as layers of pinks and carnations, and various plants to trim and tie up; besides the daily occupations of weeding, watering, pruning, and earthing.

9th.—I have just found the most curious miniature cocoons of yellow cotton, sticking on a chrysalis of the cabbage caterpillar. Some time ago, I put up two of these caterpillars in paper boxes; they were regularly fed, and made quite comfortable; and now, though one is a perfectly sound chrysalis, the other is only an empty skin. In the little book which I have so often mentioned, Mary showed me the cause of this in the dialogue between Lucy and her mother on *ichneumons*; it was from their eggs, which were deposited in the body of the caterpillar, that the maggots proceeded who destroyed it, and then spun the pretty little yellow cocoons. It is a great pleasure, Mamma, to have traced a curious fact of this kind for myself, and actually to have seen one chrysalis dwelling in another. These *ichneumons* must be very useful in thus destroying other mischievous insects. Reaumur found, that out

thirty common cabbage caterpillars, which he put into a glass to feed, twenty-five were killed by an ichneumon; and my aunt says, that if the myriads of caterpillars which prey on our vegetables are compared with the small number of butterflies that they usually produce, it will appear that they are destroyed in a still larger proportion. This is one of the innumerable instances of the goodness of Providence, which balances the necessary evils of one tribe of animals by the instinctive efforts of another.

My aunt told me, that in St. Domingo the cassada and indigo plantations are materially injured by a large caterpillar. When it changes to its last robe of sea-green, its tortures begin; a swarm of ichneumon flies fasten themselves all over the poor victim, drive their stings into the skin, and then deposit their eggs in the wounds they have made. The caterpillar swells and becomes of a deeper green; and in a fortnight, when the eggs are hatched, it appears covered with little worms, which start out of every pore. The existence of these worms is but short; after raising themselves on one end, shaking their heads, and swinging themselves in every direction, each of them begins to form its cocoon; and in two hours the caterpillar is completely clothed in a white robe. In eight days the ichneumon flies are hatched, and the little cocoons they leave behind are composed of a very fine silky cotton, of the most dazzling whiteness, which may be used without any preparation, as soon as the flies have quitted them.

The quantity of this glossy substance, produced by the millions of those little parasites, is so great, that it is said a single person has collected a bushel in two hours. But the chief importance of their services is the keeping within bounds the mischievous cassada caterpillars; and as these caterpillars are destroyed by heavy rain, it has even been proposed to collect and put them under cover, as soon as the ichneumon's eggs are deposited, in order to multiply these useful insects.

10th.—June is really a most lovely month here;—the trees are clothed in foliage of the freshest green, and flowers are scattered everywhere in profusion. Mowing is just beginning, and everybody looks busy, active, and cheerful.

I was very happy yesterday: we went to see the sheep-shearing at Farmer Moreland's; it seemed to be almost a festival, and was conducted with a degree of regularity and

ceremony that was quite amusing. Caroline delights in these rural employments ; and we were all allowed to go there early in the morning. We found the sheep inclosed in a fold under the shade of an ash-grove, and the shearers seated on the knotted roots of some of the old trees. Dame Moreland gave us some brown bread and new milk ; and before the day grew very hot, we returned home. In the evening, however, having dined early, we returned to the pretty grove and the poor bleating sheep, whom I could not help pitying when thrown down to be shorn ; though they looked a great deal more comfortable as soon as they were relieved from their thick, hot clothing.

I saw some of them washed a day or two before the shearing began ; their fleeces were well rubbed and rinsed in the stream, and then the poor creatures ran to a sunny bank,

Where, bleating loud, they shook their dripping locks.

My uncle told me that England has been always famous for its sheep and their rich fleeces, the various qualities of which are so well suited to the different branches of our woollen manufactures ; but it is the Downs of Dorsetshire, and all the southern and western counties, which supply those sheep whose fleeces are employed in making the finest broad-cloth.

We stayed till the men ceased working, and till we had seen the shearers and all their assistants sitting down to a comfortable supper, with abundance of cider ; we then left them, and came home by a long winding path. We were quite in the dark for some of the last part of the walk, which gave me an opportunity of seeing the English glow-worm on the dry banks at the edge of the forest.

When evening closes Nature's eye,
The glowworm lights her little spark
To captivate her favourite fly,
And tempt the rover through the dark.

Conducted by a sweeter star
Than all that decks the skies above,
He fondly hastens from afar.
To soothe her solitude with love.

My uncle told me that Dr. Macartney, who has investigated the subject of luminous insects with great ability, has

ascertained, that in the glowworm part of the light proceeds from a yellow substance lying underneath a transparent part of the skin. Besides this, he observed, in the last segment of the body, two minute oval sacs, formed of an elastic fibre, wound spirally, and containing a yellow substance also, but of a closer texture, and giving a more permanent light. This light seemed less under the control of the insect than the other, which it has the power of voluntarily extinguishing, and which ceases to shine when extracted from living glowworms; but the two sacs, when taken out, continue to give light for some hours.

WEEK 45.

Immortality of the Soul—Hope must be grounded on Faith—Last Sunday at Fernhurst—Human Estimation—Goat-sucker—Fernchaffer—Hawking in Persia—The Falcon—Bertha's Writing-box.

June 11th.—Sunday. ‘I think, father,’ said Mary, ‘that in reflecting on the three dispensations, it appears that neither the Jews, nor the religious people of the patriarchal ages, had that clear and distinct knowledge of the doctrine of future rewards and punishments which we Christians possess, nor that full conviction of the immortality of the soul which now cheers mankind.’

‘True,’ said my uncle, ‘those awful truths had indeed been early opened to them, and they were gradually unfolded with increasing clearness by the later prophets; but at the best they were obscurely understood, or, in the language of St. Paul, they were seen as “through a glass, darkly.” It was reserved for our Saviour to throw such a clear and steady light upon the doctrine of immortality, that “we might have a strong consolation, who have fled for refuge to lay hold upon the hope set before us: which hope we have as an anchor of the soul, both sure and steadfast.”’

‘This beautiful simile,’ continued my uncle, ‘which compares hope to an anchor, was first used by St. Paul. The ancient poets described Hope as a nymph, decorated with smiles and flowers, and soothing the labours of man with the idea of distant pleasures; but St. Paul represents hope as the stay and anchor of the soul; and so striking is the figure, that it has been since adopted into every language. He does not allude to the vain wishes arising from

a heated imagination, but to the steadfast hope which springs from faith: as the vessel is kept firm at her anchor, in defiance of storms and currents, so the Christian is "not moved away from the hope of the Gospel" by adversities and temptations.

'You are all acquainted with the ancient fable of Pandora's box; at the bottom of which it is said that, as the only means of supporting the human race under the multiplied evils that were about to issue from it, Jupiter placed the last and best blessing of Hope. It is not improbable that this fable was founded on a tradition of the original promise of the future seed; the hope of which could alone have sustained the virtuous part of mankind amidst the general corruption that followed the transgression of Adam.

'But an unsettled kind of hope will be of little avail; to be useful, it must be grounded on faith; on that entire faith which not only believes in the authenticity of our Saviour's sacrifice, and in the importance of the doctrines he taught, but which fully and gratefully confides in the sufficiency of his atonement. Then hope indeed helps us to anticipate the glorious future; we view him as risen triumphantly to heaven; and we feel that we shall partake in the happiness of the hereafter which He has promised.

'That the hopes of a future state are natural to the mind, may be inferred from the craving and dissatisfied feeling which accompanies our very enjoyments, and which always more or less clouds them with fresh wishes and indefinite hopes. These hopes, it is true, in the worldly man, are set upon pleasures, business, or ambition; or on some of those bustling objects of life, which, from their vicinity to the human eye, assume a false magnitude. But the true Christian learns that heavenly objects, which from their distance appear comparatively faint, swell upon the sight of those who earnestly study them; while the others fade away, and elude the grasp. Religion assists him in correcting those illusions of vision; faith helps him in assigning the proper direction to his hopes; and he makes it his continual care to preserve the enlightened views which, through the Divine mercy, he has obtained. This awful truth has sunk deep into his mind—"The things which are seen are temporal but the things which are not seen are eternal;" and a just impression of their relative value enables him to maintain happy composure in all the vicissitudes of life.'

Before my uncle dismissed us, he said, 'This, my dear little friends, is the last quiet home Sunday that we shall have for some time. Before we return many unforeseen changes may occur; we are going, as it were, to launch into the world; we may be separated; and our regular habits must be unavoidably interrupted. But in every situation we can cultivate and strengthen in our hearts the Christian hope; and though we may, perhaps, no longer give each other mutual aid, we can, at least, each of us watch over our own hearts. Let me then entreat your attention to a few practical hints.

'Never allow yourselves to consider religion as a painful restraint, but rather as the performance of a grateful duty. Whenever that duty has the least appearance of being irksome, search and you will find that some incompatible but favourite pursuit entices away your thoughts: throw it then aside, however blameless it may otherwise be, or however innocent may be its pleasures. Remember with whom St. Paul classes those who are "lovers of pleasure more than lovers of God."

'Frequently examine the state of your moral and religious feelings, and when you perceive a deficiency in any point, beware of lowering the standard of virtue to meet your practice, instead of endeavouring to rise to the level of your duty.

'Watch vigilantly your *small* faults. You will find the unhesitating sacrifice of any one of them productive of the purest satisfaction, and each victory will make the next struggle more easy. But, in doing this, be careful to resist that most seductive propensity of all minds, the looking back with too much complacency at the faults we have conquered, or at the virtues we possess, instead of fixing our eyes on the sins we have yet to overcome, and the improvement we have yet to achieve.

'And, lastly, arm yourselves with a determined resolution not to rate human estimation beyond its true value. No one should affect a needless singularity; but to aim at things which in their nature are inconsistent, to seek to please both God and the world, where their commands are really at variance, is the way neither to be respectable, nor good, nor happy.'

Fernhurst, for the last time.

12th.—The corn-fields are coming into ear, the hay-har-

vest is going on, new flowers are springing up; and all the walks, and gardens, and shrubberies are in the highest beauty, and yet we are going to leave this dear place! To-morrow we are to quit Fernhurst and all its happiness! But that is a silly feeling, for we all go together, and surely we may make ourselves happy anywhere, even in Ireland. A year ago I was just leaving my dear Mamma, and the happy home to which I had been so long accustomed, to place myself among strangers;—and now I am going among still greater strangers—among the Irish. But my uncle says they are a warm-hearted, hospitable people, and that the country is so full of objects of interest, that I shall not have to regret the employments of Fernhurst, nor even my favourite gardening experiments.

I am happy to tell you, that most of these experiments have succeeded very well as yet: particularly one I have been trying on my dahlias, by budding them on the roots. They have already produced some very flourishing plants; and as the bearing buds were employed, they will blossom this year. I must make you acquainted also with a little bower, which we have all assisted in making in a charming spot: it is canopied with woodbine, and lined with moss; and you might say of it—

Is this Titania's bower, where fairies play
Their antic revels in the glowworm's light?
Moss and wild thyme are all the weeds which stray
To pave her palace with a green delight.

As we were taking our last walk late this evening, we saw the goat-sucker, which is nearly allied to the swallow in its form and habits, though generally larger in size. Frederick, who is my chief preceptor in everything relating to the feathered race, tells me that, except on very dark, gloomy days, these birds are seldom seen till twilight. That is the time the insects come out which form their principal food; and he says, it is probable that the extreme sensibility of eyes calculated for that period of the day could not bear the dazzling light of the sun. Their mode of perch is singular, as they place themselves lengthwise on a branch and not in a cross direction, like most other birds. Their mouth is uncommonly large, fringed with bristles, and moistened by a glutinous fluid, to which the smaller insect adhere; and you may therefore conceive the destructive

powers of this bird, for it flies through their swarms with its voracious jaws wide open, darts in every direction at its larger prey, and swallows all, without ever closing its bill. It is in this last circumstance that it chiefly differs from the martin, the swift, and the rest of the swallow tribes; for they never open their bills, in flying, but to snap at their prey, and they shut them with a sharp peculiar noise, which every one must have observed.

There is no end to the variety of names which this bird has acquired in different parts of England—goat-sucker—goat-owl—fern-owl—churn-owl—wheel-bird—dor-hawk—night-jar, &c. In most of these names there is some allusion to its peculiar habits, its haunts, its motions, or its noises, except in the first, which is the commonest and the most absurd of all, as if a goat would allow itself to be sucked by a bird! And yet, however ridiculous, my uncle showed Frederick, in Aristotle and Pliny, that the ancients gave it a similar name.

I understand that it is not a very common bird here; but we saw it for a considerable time rapidly wheeling round and round a large oak tree, and hawking among the branches in pursuit of the fern-chafer, its favourite food. The hawking of this bird reminds me of an amusing passage in the Persian Sketches.

‘At Shiraz, the Elchee (envoy) received a present of a royal falcon. Before going out, we had been amused at seeing our head falconer put upon this bird a pair of leathers, which he fitted to its thighs with as much care as if he had been the tailor of a fashionable horseman. I inquired the reason of so unusual a proceeding. “You will learn that,” said the consequential master of hawks, “when you see our sport.”

‘The first hare seized by the falcon was very strong, and the ground rough. While the bird kept the claws of one foot fastened in the back of its prey, the other was dragged along the ground till it had an opportunity to lay hold of a tuft of grass, by which it was enabled to stop the course of the hare, whose efforts to escape would have torn the hawk asunder, if it had not been provided with the leather defences which I have mentioned.

‘The next time the falcon was flown gave us a proof of that extraordinary courage which its whole appearance, particularly the eye, denoted. It had stopped and quite dis-

abled a hare by the first pounce, when two greyhounds, which had been slipped by mistake, came up, and endeavoured to seize its prize. They were, however, quickly repulsed by the falcon, and with a boldness that excited our admiration and astonishment.'

And now, dear Mamma, I must go and pack up my pretty writing-box which my uncle has given me; it holds paper, and pens, and ink, and pencils, my journal and account-book, and everything one can want; even a nice little red leather case for colours, which Caroline made for me; and yet it is not above two inches deep. It is quite flat—but I can make a desk of the lid; and as it is to lie in the bottom of the carriage, under our feet, I have put it in a green cloth cover. I was afraid it might be troublesome; but my uncle and aunt know how to make every one comfortable without inconvenience to others.

This is my last line from dear, happy Fernhurst!

JOURNEY.

All punctual—Observations on Dew—Dr. Wells's Experiments—Filamentous Structures—Radiation—Inclined Plane—Salt Mines—Aqueduct—Power loom—Patent Lace—Slate Quarries—Wooden Railway. 1670—Iron Railways, when invented—Mona—Druids—Eastern Origin of the Welsh and Irish—Visit to the Light-house—Tides—Bottom of the Sea—Conclusion.

13th June, Worcester.

This morning, at seven o'clock, we set out on our journey. Everything had been arranged and packed the day before, so there were no delays in the morning; all were punctual, and I assure you, Mamma, that I was ready, and my work-box and travelling-book in my hands, before my uncle gave the first summons for assembling. We have several books in the carriage, but no loose parcels; and withinside it does not look as if it was prepared for a long journey.

Poor little Grace has been left with the Maudes, in whom my uncle and aunt have the most perfect confidence.

We have seen the fine old cathedral in this city, and the porcelain manufactory, both of which I had intended to describe to you; but my aunt recommends it to us to go to bed, as we are to be up very early to-morrow morning, in order that there may be full time for seeing the carpet manufactory at Kidderminster, on our way to Shrewsbury, where we are to sleep. So, good night, though it is scarcely yet

dark. What charming long days there are in this country compared with those of Rio!

14th June, *Shrewsbury*.

Sweet is the dubious bound
Of night and morn, when spray and plant are drench'd
In dew.

Everything was in that state when we set out early this morning from Worcester; it reminded me of all my uncle had told me about dew, and I took the opportunity of asking him if dew is formed in the morning. 'It continues to form in shaded places, after sunrise,' said he; 'but there is a shorter interval between sunrise and its ceasing to form, than between its first appearance in the afternoon and sunset; though Dr. Wells thinks, that, if the weather be favourable, more dew forms a little before and a little after sunrise, in shaded places, than at any other time.'

My aunt remarked, that a few years ago, while in constant attendance on a sick child from July to September, she rose every morning at daybreak; and had an opportunity of observing, that about an hour before sunrise the dew was particularly abundant. The window was frequently kept a little open at night, when the room was close and the weather still; but the air became so chilly just as this heavy dew came on, that she was always obliged to shut it; yet during the night the chill was never perceived; which corroborates what Dr. Wells says, that the cold of the atmosphere is greater in the latter than the prior part of the night.'

In the course of Dr. Wells's observations, he found that dew does not form readily on gravel-walks; and that if the atmosphere be clear, neither the road nor pavement is moistened with dew, though the grass on the road-side, and painted doors and windows, are frequently wet. He found also, that wool, though highly attractive of dew, was prevented, if placed on a gravel-walk, from acquiring as much dew as an equal parcel of wool, if laid upon grass.

I asked why Dr. Wells used wool in these experiments, and my uncle told me, that at first he had only compared the quantities of dew on bodies having smooth surfaces; but that he found wool much better adapted to collect dew from the atmosphere, as it readily admits the moisture amongst its fibres, and retains what it receives very firmly. Filamentous and downy substances are by far the most produc-

tive of cold, such as wool, cotton, and flax, and still more fine raw silk and swan-down; all these were more steadily cold upon clear nights than even the grass, but swan-down showed the greatest cold.

'I have already explained to you,' continued my uncle, 'that the surface of the earth, and all substances upon it, radiate back into the sky at night the heat which they receive in the day; and that when this radiation is unobstructed by clouds, the cold it produces is proportionably greater. But the degree of cold is very much augmented when the form or situation of these substances prevents their deriving fresh supplies of heat from warmer bodies in contact with them or in their neighbourhood. Most of the substances which I have named are not only naturally bad conductors of heat, but their form scarcely permits them to transmit from fibre to fibre any heat they might acquire. This is the reason why dew appears in greater quantity on shavings of wood than on a thick piece of wood; and why filamentous substances become colder than all others.'

'On a dewy evening the Doctor depressed a small tumbler into the soft garden-mould, so that the brim was level with the ground; and he placed another standing on the surface of the mould: in the morning the former was dry in the inside, while that which stood on the surface was dewed; and the thermometer being applied to each, the heat of the depressed one was found to be 56° , while the other was only 49° ; for not only had the upper glass more readily parted with its heat by radiation, but the other had received a constant supply of heat from the surrounding earth. In the same manner it may be explained, why the prominent parts of bodies are often encrusted with hoar frost, while the more solid and retired parts are free from it.'

I then inquired, why there is less dew on a windy evening; for one would suppose that wind, instead of preventing the radiation of heat, would rather help to promote it.

He replied, 'All bodies exposed in a clear night must undoubtedly radiate as much of their heat during a storm as in the most perfect calm; but whenever radiation is going on the air is more or less warmed by it; and consequently wind which is only air in motion, serves to bring a continuous stream of its warm particles into contact with those bodies. This restores almost as much heat as they had lost, and prevents the deposition of dew; for, you know, dew is nothing

but the moisture of the atmosphere condensed by meeting with colder substances ; and, therefore, whatever tends to equalize the temperature of the air and of those substances must obstruct the formation of dew.'

We breakfasted at Kidderminster, and saw every part of the carpet manufactory ; but the chief interest of the day has been a magnificent *inclined plane* on the Shropshire canal, which my uncle was so good as to go out of the direct road to show us. It is a slope of 350 yards in length, with a fall of 70 yards, connecting the canal on the high ground with the canal on the lower level ; and the boats, being placed in a kind of cradle upon wheels, are allowed to roll gently down the inclined plane, or are drawn up by the power of a small steam-engine. By this contrivance three great savings are effected, he said. First, the prodigious expense of building twenty-one *locks*, which would be required for that height ; secondly, the time occupied in passing through all those locks ; and thirdly, the quantity of water which is wasted every time a lock is opened, and which, in some parts of the country, it is very difficult to replace in a dry summer.

Wood Lodge.

16th.—So far our journey has been most agreeable in every way. My uncle and aunt not only stop wherever there is anything to see, but they tell me what to observe, because they know that, through ignorance, I might overlook the things which deserve the most attention. Only think, Mamma, of their having actually come into Cheshire, in order to show me a salt-mine. My uncle promised it many months ago, and he never forgets a promise to any of us, even about a trifle. Some old friends of theirs, Mr. and Mrs. L., live at this pretty place, where we arrived yesterday evening. We were received with warm affection ; and I was considered as one of my aunt's children, and treated with equal kindness.

As soon as an early breakfast was over, we all drove or rode to Northwich, about five miles from this ; and between the fineness of the day, the good-nature of both new and old friends, and the complete novelty of going down into a mine, it has been a delightful expedition indeed.

By my uncle's directions, I put on an old dress of one of the miners' wives over my own, to prevent it from being soiled by the iron chain and the bucket in which we were

let down. By the time I was near the bottom, I began to hear the confused sound of the people below, and to see the indistinct flickering of candles; and on looking up, the daylight admitted from above by the opening through which we had descended looked smaller than the moon. The walls and pillars left occasionally to support the roof of the mine, quite disappointed my imagination: for they are of a dirty brown colour, instead of the brilliant white I had expected. In a few places, indeed, they sparkled a little in the gleams of the candles which we carried.

After walking about in various directions, and feeling as if in the crypt of some large church, we came to where the men were working. They were just going to light the train to blast off a rock of salt; and I assure you it was very near the place where we stood; but we were secured behind a projecting point. The roof, there, was not above twenty feet high, and the sound was very grand, continuing to reverberate at intervals for a minute and a half.

The salt lies in strata, from between which water is always trickling; and the white salt used for eating is made from this water, which is pumped up above ground either by steam or horse power. It is then put into what are called preparing-pans, where it is brought to the degree of heat requisite for separating the earthy impurities. These subside to the bottom, and leave the brine clear, and ready to be afterwards evaporated in the salting-pans, which are shallow, and I am sure twenty or thirty feet long.

Some years ago, the excise-duty was twenty-five times the actual value of the salt; but that is now taken off, and, therefore, great additional quantities are raised for agricultural or other purposes. I hope this will benefit the workmen, who seem to be very poor, for their cottages are very wretched: each of them, however, is surrounded by a nice little garden; and my aunt made me observe that the thrift, or sea pink, flourishes there as well as where it grows naturally in the salt atmosphere near the sea-shore.

I can write no more now. We continue here to-morrow I believe; and the next day we shall go on to Llangollen.

Porthyn Arms, Bungor.

20th.—Our whole journey through Wales has enchanted me;—the mountains, rocky streams, and woody banks, have more than realized all I had heard and read of its wild and impressive scenery.

My uncle took us to see the celebrated aqueduct of Pontcysylte, near Llangollen, which conducts the Ellesmere canal across the valley of the river Dee, at a great height from the bottom, and therefore saves the immense expense and loss of time that would have been occasioned by a series of *locks* on each side of the valley. It is one thousand feet long, and supported on twenty stone piers, which rise to one hundred and thirty feet above the bed of the river; and he showed us that the water-course, which, in general, is built of stone and made tight with clay, is, in this aqueduct, composed of plates of cast-iron, that rest on great iron ribs; the sides and bottom being screwed together, and the joinings filled with cement.

Having arrived in good time at Llangollen, we all went out to walk; and, by some accident, my uncle entered into conversation with a very intelligent Scotchman, who was erecting some power-looms. Machinery was, of course, the subject, and I think you will be amused by his description of an improved method of singeing off the small fibres of patent lace, so as to give it the proper *wiry* appearance. He was so good as first to explain to us the common mode of destroying the rough nap upon calico.

There is a smooth iron cylinder set horizontally over a furnace, the heat of which can be nicely regulated. A reel is so placed on each side of it, that the cloth which is rolled round the one, when wound off on the other, is lightly drawn over the cylinder, and comes in contact with its red-hot surface, with just sufficient velocity to allow the loose woolly filaments to be burned without injuring the cloth. The finest muslins are made to go through this operation, and with such precision as to be very seldom damaged. But in lace it is not enough to remove the projecting fibres; all those that are inside the texture must also be destroyed, as the beauty of the lace is greatly increased by the hard crisp look of the main thread; and to effect this, the lace is usually drawn over a line of gas-flame, so as to pass a current of heat through the open spaces. It has been found, however, that even the combustible net-work of lace stops the ascent of the flame; in the same manner that the wire-gauze, in Sir Humphrey Davy's beautiful lamp, prevents it from communicating with the inflammable gas in a mine. In the new method, to overcome this difficulty, a horizontal tube is placed a little above the lace, with a narrow slit just over the line or sheet

of flame; and an air-pump being applied to the tube and rapidly worked, a strong draught is produced into the slit to replace the exhausted air. This draught draws up the flame along with it, in spite of the intervening meshes of the lace, and thus singes away the useless fibres within as well as without.

In the course of our journey from Llangollen to this place, my uncle frequently made us observe the judgment with which the new road has been laid out by Mr. Telford, the same engineer who constructed the Llangollen aqueduct. In such a mountainous country it was impossible to avoid all hills; but by gradually winding up their sides, or by cutting the road out of the face of almost perpendicular cliffs, he has preserved one uniform and easy slope to the top of the highest ground over which it passes; and yet, at the same time, he has shortened it by several miles. And besides all this, he has shown so much taste in the line he adopted, that, my aunt says, one would think his only object had been to display the romantic scenery of North Wales to the best advantage.

We often got out of the carriage, and strolled about to look at the pretty waterfalls and rocky passes; and we stopped for some time at the iron-bridge of Bettws. It is a single arch, of more than one hundred feet span. The iron-work that supports the road-way consists of the emblems of the three kingdoms and Wales—the rose, thistle, shamrock, and leek; and along the lower rib of the whole arch there is the following inscription, in open iron letters, each of which is about two feet high:—

‘This bridge was constructed the same year the battle of Waterloo was fought.’

All this road was new to my aunt; she admired some of the views exceedingly, and was, I think, particularly struck by a very wild spot where Ogwen Lake is pent up by a circle of dark, rugged, misty hills. In approaching this town we were amused by the various uses to which slate is applied—palings, stiles, gate-posts, tables, benches, troughs, milk-bowls, and many others; and as the famous Penrhyn slate-quarries are within a few miles, my uncle proposes to remain here to-morrow, in order to visit them.

Penrhyn Arms, Bangor

21st.—Well, Mamma, we have been to those famous

quarries, and they are indeed wonderful. But to me the most striking thing about them is, that such prodigious excavations should have been made in so short a period; for we were attended by an old man who actually remembers the first opening of the large quarry. It also seemed astonishing that they should have been the work of men, who appeared so diminutive, when compared with the huge blocks of slate round which I saw them clustering and bustling like a colony of little ants round a straw.

Everything is done here by a kind of task-work. A piece of the rock is bought by a party of men, who agree to work together: they convert it into as great a number of slates as they can, and the overseer purchases them at stated prices. Their first operation is to blast off a large block: this is done by making a round hole about two or three feet deep, with a pointed iron crow; a pound of gunpowder is then poured in, and the hole is rammed full of clay or broken slate. A thick wire, which was kept in the hole while the ramming was going on, is now withdrawn, and a straw filled with fine powder is introduced into its place, with a bit of match-paper fixed to the upper end. All is now ready—a man calls out with a loud voice that he is going to fire—the workmen scamper away, and hide themselves in the hollows of the rock—and he then lights the slow-match, and escapes as fast as he can. I saw several of these explosions, or 'shots,' as they call them, each of them cracking the rock to a great distance, and carrying up in the air a frightful shower of fragments, which, my uncle says, reminded him of the stones he saw thrown out of Mount Vesuvius, in one of the great eruptions. The masses that were cracked by the explosion are now detached with levers and wedges, and broken into pieces of a proper size, which are then split into slates, while the blasters are preparing fresh materials; so that no one is idle for a moment.

The names given to the different sizes of slates will amuse you; they are taken from all ranks of our sex;—queens, duchesses, countesses, and ladies; and each size has its peculiar thickness. I was very much interested by the quickness and expertness with which the splitters did their part of the business: the workman gently drives a chisel, or thin wedge, with his mallet, into the edge of the block—you see the crack running slowly along—and then, by a certain motion of the chisel, he separates the whole surface as neatly

as a carpenter splits a piece of straight deal into laths. I was surprised at seeing some of these thin leaves of slate bending considerably while the splitter was forcing them off; but my uncle says, that all stones have more or less elasticity, and that a small marble ball will rebound to a considerable height, if dropped on a hard substance. Some kinds of stone have a disposition to warp or bend permanently, as he made me recollect was the case in one of the slabs of marble in the dining-room fire-place at Fernhurst; and he says that the flags in many of the streets of London are hollow on the upper surface, from their having been originally too thin, and from being supported only at the edges, they have yielded in the middle.

After the slates are split, they are squared and cut to the various shapes and sizes used in roofing: this is generally done in a rough but expeditious manner, with a sort of chopper, but some of the larger and finer kinds are cut with frame-saws, so as to be precisely of the same dimensions, and to have nice smooth edges. These are called *milled* slates, because the saws are worked by a water mill. Of course, we went to see this operation: a fine mountain-stream turns the wheel which gives motion to more than a dozen pair of long frame-saws; each pair is set to the distance required for the length or the breadth of the slate, so that the parallel sides are cut by the same stroke; and, as the saws move forward and backward, water is kept constantly dripping into the cut, and sand is thrown in by boys. The saws, we were told, would make but slow progress without the assistance of sand—the sharp grains of which are carried forward by the jagged teeth of the saw, and are thus made to tear away the slate.

‘It is on this principle,’ said my uncle, ‘that precious stones are cut by a thin circular plate of iron, with emery or diamond powder. And a seal-engraver’s apparatus is only a sort of lathe, to which he can attach small copper wheels that are made to revolve with great rapidity. To the plain edge of one of these wheels he applies oil, with a little diamond powder, which soon cuts into the hardest stone; and thus by the form and size of the wheel, and the direction which the stone is pressed against it, he can accomplish an device, either in relief or intaglio. In all these cases, the particles of sand, emery, or diamond, bed themselves in the soft metal, and grind away the harder surface opposed to

them ; and, what will appear rather singular at first sight, when two hard substances rub against each other, it is the hardest which wears away the most. For instance, the highly tempered steel *knife-edges*, by which some pendulums are suspended for experimental purposes, are less liable to wear than the still harder agate planes on which they work : for the minute atoms of dust conveyed by the air adhere to the steel, and in the course of time act upon the agate.'

But to return to our mill. Solid blocks, thick enough to make about twenty slates, are thus sawed first, and afterwards split in the usual manner. Here, also, we saw an immense number of little writing slates ; they are made from the finest-grained part of the quarry ; and their smooth surface is produced by an operation very like that of planing a board.

The great blocks are carried from the quarry to the mill, and the slates, when pressed and finished, are also conveyed to the seaside, by little waggons on *iron railways*. It is wonderful what a load a horse will draw in this manner, when compared with the utmost work he can do on the best common road ; and yet a railway appears to be a very simple contrivance. Two parallel lines of flat iron bars are laid along the road ; the horse walks between them, and thus the wheels of the waggon, in rolling along the bars, neither meet with the stones and obstacles which would impede their motion on a road, nor do they sink into its hollows and soft places. The bars are scarcely broader than the rim of the wheels, which would, therefore, slip off, but for a little raised ledge, or, as it is called, a *flange*, along one edge of each bar. When railways are intended to carry heavy weights, both going and coming, they must be laid perfectly level ; but at these quarries, as all the weight goes *down* to the port for embarkation, the same horse that draws several loaded waggons hooked together down hill, can return up hill with an equal number of empty ones.

From the mill we drove to the port of Penrhyn, which is just behind this house, and where all the slates are shipped. A prettier spot cannot be seen—the sea to the northward—the Strait of Menai—the blue hills of Wales—the town of Beaumaris, on the opposite coast of Anglesea—and the quay or pier embosomed by the surrounding high banks, with a few patches of trees on their summits. The whole harbour was full of vessels waiting their turn for loading, and the busy appearance of waggons, horses, and drivers, ships,

boats, and sailors, all in motion, presented a most interesting scene.

Before I go to bed, I must add a curious coincidence that occurred this evening. My uncle had brought with him, as his travelling book, the *Life of the Lord Keeper Guilford*; and, after he had been explaining to me the history and the importance of rail-roads, he opened his book, and I sat down to my journal. But he had scarcely begun to read, when he came to a passage describing a road, nicely levelled, and laid with long boards—to all intents a *railway*; and this was used for conveying coals from one of the pits at Newcastle, so long ago as the year 1670. Yet it was not, my uncle remarked, till 1767, that *iron* railways were invented. Mr. W. Reynolds of Coalbrook-dale first adopted them; and his example was quickly followed in all parts of Great Britain, and indeed all over the world.

One word more, dear Mamma, and then I will go to bed; but my uncle has just read to us such an interesting passage from that same Lord Keeper's life, that I really must tell it to you. The children of the family at Badminton were bred with philosophical care; no inferior servants were permitted to talk to them for fear of their imbibing some mean sentiments; and he mentions the following anecdote as a proof of their high principles. Lord Arthur, who was then little more than five years old, reproached the Chief Justice Hales with his cruelty in condemning men to be hanged. The judge told him, that if they were not hanged, they would continue to kill and steal. 'No,' replied the boy, 'you should make them promise, upon their honour, that they would not.'

What a fine sense of honour that child had!

June 22nd.—

Mona Inn.

Mona on Snowdon calls!
 Hear, thou king of mountains, hear;
 Hark, she speaks from all her strings;
 Hark, her loudest echo rings;
 King of mountains, bend thine ear:
 Send thy spirits, send them soon,
 Now, when midnight and the morn
 Meet upon thy front of snow:
 See their gold and ebon rod,
 Where the sober sisters nod,
 And greet in whispers sage and slow.

Snowdon, mark! 'tis magic's hour;
 Now the mutter'd spell hath power—
 Power to rend thy ribs of rock,
 And burst thy base with thunder's shock;
 But to thee no ruder spell
 Shall Mona use, than those that dwell
 In music's secret cells, and lie
 Steep'd in the stream of harmony

Caroline repeated these lines after we had ascended the new road from the Menai bridge, and were losing sight of the extensive view of Plas Newydd, the winding strait, and Snowdon proudly towering over the Caernarvon mountains.

'Well-chosen lines,' said my aunt; 'Mason's Caractacus is always interesting, but particularly so in this once sacred island, where—'

————— with more than mortal fire
 Mighty Mador smote the lyrr.'

'Mason gives such a nice touch of mystery to these lines,' said Caroline, 'that I almost feel the magic spell, and expect to see the mountains whiten with the slow-descending Druids.'

'I wish, uncle, that you would tell me something about the Druids; I am very fond of the history of those early times.'

'That, probably, arises from your love of fairy tales and fables, Bertha; for there is much fable, I believe, in all early history: but be that as it may, we may amuse ourselves with Druidical fable while we drive along this bare country:—now for your questions.'

'In the first place, then, uncle, what were those mysterious Druids?'

'The Druids were the priests or ministers of the religion of the ancient Britons. Their worship was devoted chiefly to the Sun; but they had, it is thought, several inferior deities. They offered human victims in sacrifice, and practised many extraordinary rites; the caverns and gloomy groves of oak in which they dwelt, and the dread which hung over their mysterious worship, gave them a terrific influence over the minds of the people. Music aided superstition in preserving this influence; for they were attended by bards, whose effusions, supposed to be inspired, either raised or lulled the passions as they chose. This is expressed in the address of the chorus in Caractacus to Mador the chief of bards:—'

Mador, thou
 Alone shalt lift thy voice; no choral peal
 Shall drown thy so'lemn warblings; thou best knowest
 That opiate charm which dulls corporeal sense:
 Thou hast the key, great Bard! that best can open
 The portal of the soul; unlock it straight,
 And lead the pensive pilgrim on her way
 Through the vast regions of futurity.

'The Druids alone had the privilege of wearing white clothes; their persons were inviolable; and they were exempted from all service and taxes. What little knowledge there was in those times was entirely confined to them; so that, besides their priestly duties, the practice of medicine and the administration of justice were in their hands; and those who resisted their decrees were placed under a dreadful ban, or interdict, during which no one dared to speak or look at the culprit. Thus possessing all the real power of the state, and venerated as the immediate interpreters of the gods, the children of the highest families were eagerly made over to them; and even princes were ambitious to belong to their fraternity. This unbounded influence and their great riches naturally exciting the jealousy of the Romans, in the reigns of Claudius and of Nero, they were nearly destroyed; and the oak woods of Anglesea, or, as it was then called, Mona, the residence of the chief Druid, were burned. There are still many remains of their temples in this island, and it is said that some of their caves have been traced,

— - where, underneath
 The soil we tread, a hundred secret paths,
 Scoop'd through the living rock in winding maze,
 Lead to as many caverns dark and deep.

'You spoke of their riches, papa,' said Mary; 'but by what means could those inhabitants of rocks and woods have acquired any?'

'I think we may conclude that those who possessed such an unlimited ascendancy over the people must have known how to enrich themselves; and you may also recollect, that as their principal establishments were in our best mining districts, it is probable that they supplied the country with all the tin, copper, and lead that were used. It has been further suggested that they availed themselves of the famous Parys copper-mine in this island, not only for its valuable

produce, but for the purpose of imposing on the credulity and superstition of their followers; for the apparent conversion of bits of iron into copper, when steeped in the strongly saturated water of the mine, as well as the blood-coloured streams which were thus produced, could have been easily represented as resulting from the supernatural power of those crafty impostors.'

'You said, uncle, that the worship of the Druids was chiefly directed to the Sun; from which I suppose they were the fire-worshippers you mentioned on May-day, who came here from the East.'

In reply, my uncle told me, that 'there certainly were some points of resemblance between the Persian Magi and the Druids of Britain. They were each forbidden to worship the deity within covered buildings; and all acts of devotion were confined to open temples or consecrated forests. Like the Persians, they beheld the Creator in the works of nature; and gigantic trees and massive rocks were the symbols of Almighty power which they most admired.

'The Druids and the Baal worshippers of Asia formed sacred heaps of stones on the tops of the hills. Many of these are to be found in Cornwall, Wales, Scotland, and Ireland—and the name which they bear, of *Cairn*, is derived from a Hebrew word descriptive of buildings like the pyramids of Egypt, or the cone shaped pagodas of India, which are supposed to have been emblematical of the rays of the sun.'

I reminded my uncle of the singular temple which cousin Hertford saw in the Isle of Lewis.

'Yes,' he said, 'it is evidently the remains of a great Druidical work; and Maurice, in his "Indian Antiquities," observes that Stonehenge, a model of which I once showed you, Bertha, plainly alludes, in situation, number of stones, and other circumstances, to the Asiatic Astronomy, and resembles in every respect the ancient style of temple used by the Persians before the time of Zoroaster. It was he who first covered in the Persian temples to preserve the sacred fire; and, therefore, the arrival of the colony here, who introduced the fire-worshippers, must have been in a very early age. But,' he continued, 'I must not lead you into this maze of antiquarian difficulty; it has been a very interesting object of research to a few learned people, though it can only perplex the half-informed.'

'But tell me, uncle, is this idea of an eastern colony a very new one?'

'Oh no,' said he, 'it has long existed in tradition, and is alluded to in one of the Druid's odes in Caractacus.

"Hail, thou harp of Phrygian frame!
In years of yore that Cambria bore
From Troy's sepulchral flame;
With ancient Brute, to Britain's shore,
The mighty minstrel came."

I asked then if there were any traces of the Eastern languages amongst us, besides the few detached words he had once mentioned to me; though I thought there was but little chance that any could have been preserved in a country where so many nations had successively settled.

'Yes,' said he, 'a celebrated antiquary has proved that there is really a strong resemblance between the Irish language and the Hebrew, which is considered the original, or first of all languages. In the Welsh, also, or British, which is of the same nature as the Irish, many words appear to be of Eastern origin; and a gentleman of Bristol, having lately collected the common old British names of the indigenous plants, has found several of them to be in sound and sense pure Hebrew.'

'Pray, uncle, what is the meaning of the word Druid—would not that throw some light on the subject?'

'It is impossible,' he said, 'now to determine its original meaning; and, indeed, the derivations of that kind of words are in general only fanciful guesses. By some, Druid has been derived from a Greek word *drus*, signifying oak; and by others from an old British word *dree*, which has the same meaning. It has also been supposed to come from a Saxon word *dryth*, which means magician; and, according to others, from a Celtic word *drui*, a doctor or learned man. There is a curious circumstance which seems to corroborate its derivation from oak,—namely, that in every country where the worship of the sun has prevailed, the oak has been venerated. It is also singular that the two names by which that tree is still known in Persia and India, had the same meaning in the ancient British and in Irish, *gaur* and *bakk*.'

The conversation was interrupted by our arrival at the inn, where my uncle has determined on passing the night as we were occupied a much longer time than he had e

pected, in examining the magnificent chain bridge, lately suspended across the straits of Menai. I have made a little sketch of it for you, dear Mamma, which shall be accompanied by as good a description as I can give; but in the mean time I must tell you, that this 'wonderful piece of work,' as my uncle calls it, is almost two hundred yards long from pier to pier, and so high above the water, that large vessels pass under it with all their sails set.

Holyhead.

23rd.—Here we arrived this day at eleven; early tomorrow we are to sail, and in six hours we shall probably arrive in Ireland. What our immediate operations are to be in Dublin I do not yet know; but my journal shall be regularly kept for your satisfaction, my dear Mamma, though probably not so much at length as at quiet, peaceful Fernhurst.

On the road from Mona, this morning, we were talking over our travels; and as we all agreed that they had been delightful, my aunt asked each of us what was the peculiar circumstance that had made this journey appear so very agreeable. One suggested that it was the uninterrupted fine weather; another, the gaiety and good humour of the whole party; a third said it was the kindness and indulgence of my uncle and aunt; but Wentworth was decidedly of opinion that it was because 'we had not pushed on in a desperate hurry.'

My aunt agreed that all those circumstances had concurred in promoting the general cheerfulness; but she thought that some others might be also mentioned. For instance, there had been no indecision in our plans; the whole route, and the objects to be seen, had been previously discussed; the wishes of all had been consulted; and with that happy mixture of candour and of consideration for others, which constitutes good breeding, they had been expressed, adopted, or waived, as appeared most suitable to the general taste. The punctuality of everybody had been another source of satisfaction; as well as the mutual pains to share with each other every little discovery; and she placed above all, the disposition to be pleased. 'Even here,' she added, 'where to most people the *ennui* of such a place as Holyhead is only varied by dwelling on the expected miseries of a voyage, the same happy habits will produce the

same results ; out of doors you will, I am sure, find sufficient objects of interest, and within, we can double the pleasure of our journey by recalling the principal occurrences ; Bertha, indeed, will have the additional resource of her journal, the scribbling of which has been her daily, and, I fear, her nightly occupation for the past twelve-month.'

We soon after walked to the beautiful new pier and lighthouse, which have both rendered the harbour so much more safe and convenient than it was formerly ; and then my uncle, Wentworth, and Frederick, proposed going to the Stack lighthouse, on the other side of Holyhead Island. Caroline and I begged very hard to be allowed to accompany them, and at last my uncle consented, though he thought the walk would be too fatiguing for us.

We scrambled up the high bare mountain, which rises behind the town ; and certainly no place ever looked more bleak and comfortless. At last the path unexpectedly led us to an abrupt precipice, at the bottom of which the sea beat in among the rocks with terrible violence. Indeed I could scarcely bring myself to look down. We found here a flight of steps, four hundred, I believe, which are cut in the rock, and which wind along its face to a sort of platform. We descended very carefully, keeping, as you may suppose, close to the rock, for the wind was rather high, the steps narrow, and we were often startled by the flocks of sea-birds that suddenly bounced up from the cliffs.

From this platform a sort of bridge of ropes extends to the Stack-rock, on which the lighthouse stands ; the bridge is a hundred feet long ; the sides are of net-work, and a few boards are loosely laid to walk on. It all moves so much, that I could not help feeling a little afraid ; and once the wind having blown my light gown into the openings of the net-work, I fancied that the guide, who was walking close behind, was pulling me back ; I stopped, and he scolded me for stopping ; but my uncle fortunately heard us, and smiling at my nonsense, he explained the cause of my alarm.

The poor lighthouse men are looking forward with great satisfaction to a new chain bridge which is preparing for this place. It will not only be more safe and convenient for them in stormy weather and dark nights, but, by inducing more travellers to visit them, it will help to cheer them

loneliness; and as there is something in such very wild and dreary scenes that touches a stranger's sympathy, they will no doubt frequently obtain little presents, which will enable them to indulge in a few more comforts than they can now afford. In truth, this lighthouse must be a melancholy abode; the wind always howling above, and the sea continually roaring below, and sometimes even throwing its spray over the windows. It was, however, very nice and clean, and as comfortable as such a place can be: my uncle took us up into what is called the lantern, and explained the use of the concave metallic reflectors which are placed behind the lamps for the purpose of increasing the brilliancy of their light by reflection. He also showed us the contrivance by which the light is made to disappear every two minutes, in order that sailors should be able to distinguish it from all other lighthouses in the Irish Channel.

In returning, we observed that the tide had ebbed in the harbour, which had been so full when we first arrived, that the water came up almost to the door of the inn. It was now nearly empty; great mud banks extending from each side, and leaving only a little winding stream in the middle. This led to some questions about the cause of the tides, and my uncle promised that to-morrow, when we are quietly seated on the deck—as neither of us intends to be sea-sick—he will endeavour to make me comprehend the manner in which the moon acts upon the ocean, so as to raise the waters in one part of the globe while they are depressed in another.

He then joined in a conversation that had been going on between Wentworth and Caroline, about the bottom of the sea. He said they were both greatly mistaken, if they supposed it to be everywhere a flat even surface; on the contrary, like all other parts of the crust which surrounds the globe, it consists of sloping hills and plains, rocks and mountains. When these approach nearly to the surface of the water, they are called shoals and banks; and when their summits rise above it, they become islands. The different strata that compose the coast may be often traced to some island at a considerable distance; the shores of France and England exactly correspond in some places; and to show the continuity of the strata, he says it is well known that many springs of fresh water, which must proceed from the land, rise through the sea from its bottom. He gave several instances of this, but I recollect only Bridlington Bay, in

Yorkshire; and the Gulf of Naples, where there is a spring of hot water, that bubbles as it comes to the surface. Bituminous and mineral waters are also found rising through the sea; and near Cumana, in South America, there is a spring of *naphtha*, which spreads itself on the waves, and frequently inflames.

When we reached the inn, we found that my aunt and Mary had bought some beautiful specimens of the green stone of Anglesea: it is called Mona marble, and is veined something like the verd-antique; but my uncle says it is not marble, but a species of *serpentine*; and that, like the green serpentine of Ireland, there is so much *mica* in it that large pieces will not take an even polish.

I had intended to have given you some description of the great causeway which has been made to connect the little island of Holyhead with the great island of Anglesea; but my uncle is waiting to enclose this to London, and my aunt is almost out of patience at my not going to bed, as we are to embark very early in the morning.

I must, therefore, abruptly conclude—though this is my last English letter. Oh! when shall I again embrace you and dear Marianne!

Your ever affectionate

BERTHA MONTAGUE.

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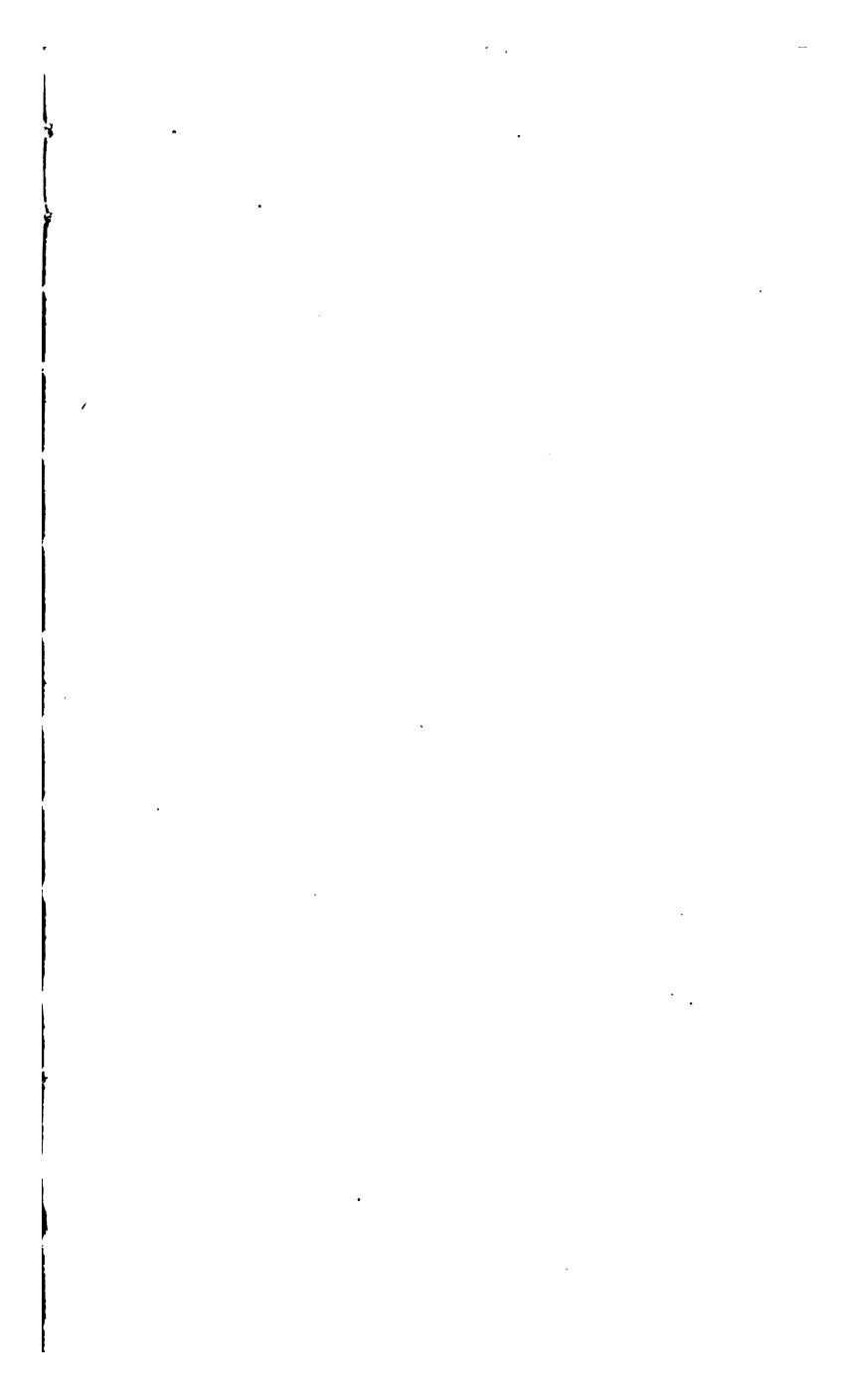
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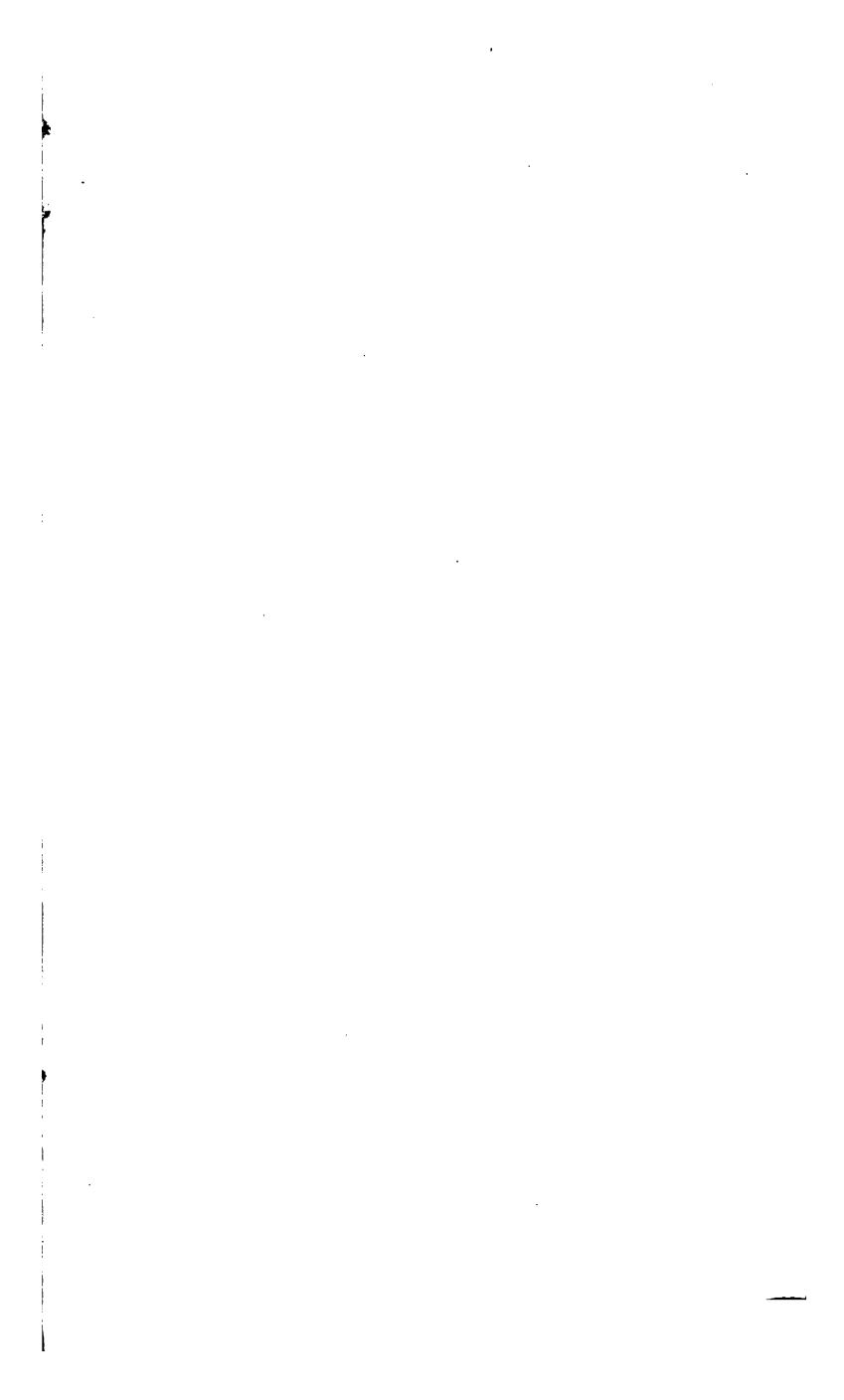
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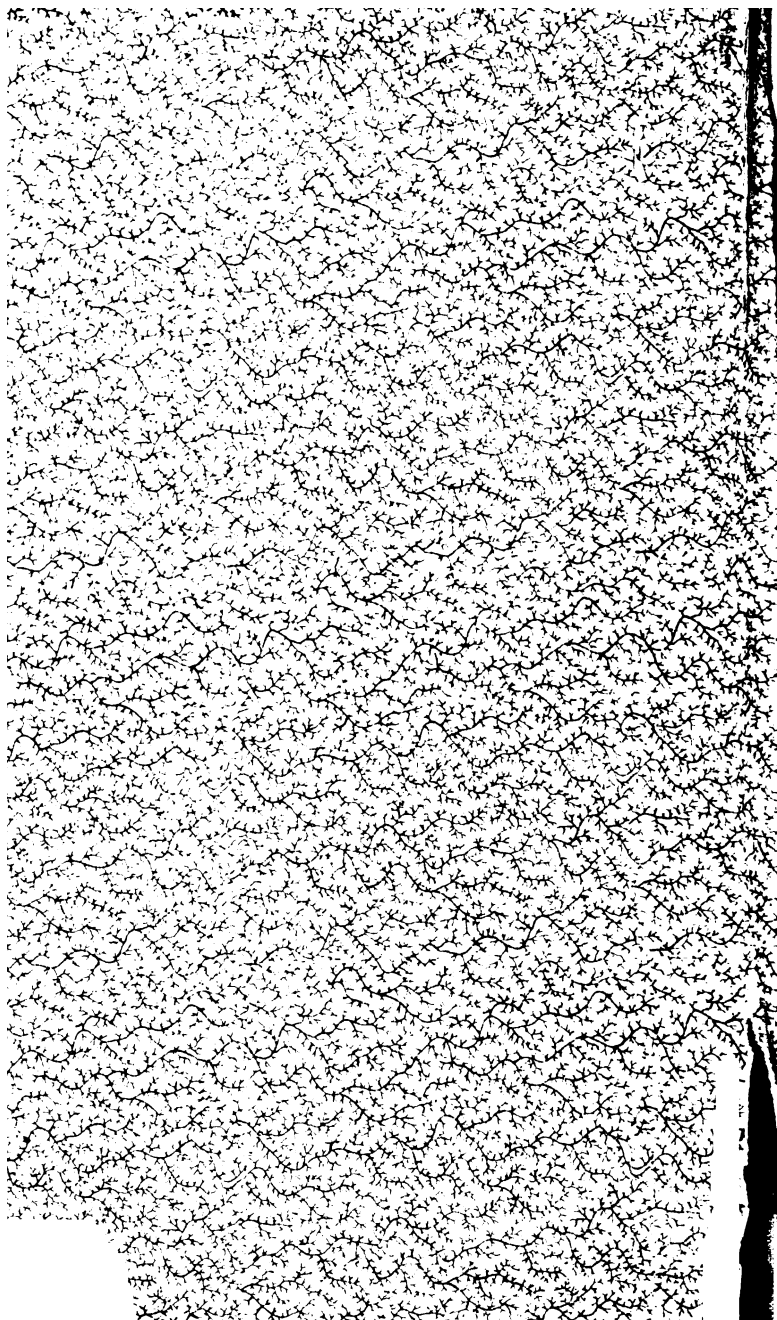
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